

University of Washington 2006-08 General Catalog



Founded in 1861, the University of Washington is one of the oldest state-assisted institutions of higher education on the Pacific coast. From its original site on a 10-acre tract of wooded wilderness that is now located in downtown Seattle, the campus has grown to comprise 703 acres of trees, landscape, and buildings. Located between the shores of Lake Washington and Lake Union, it is in a residential section of the city that long has been considered one of the most attractive in the nation. Two additional campuses, one south of Seattle in Tacoma, and one north in Bothell, were opened in 1990.

Enrollment at the University in autumn quarter 2005 was almost 43,000, including its campuses in Bothell and Tacoma, of which 26,000 were undergraduates and the balance were in professional and graduate programs. Almost 90 percent of the undergraduates enter as freshmen from Washington high schools or as transfer students from Washington community colleges or other colleges and universities in the state. The grade-point average for the regularly admitted freshman class entering in autumn quarter 2005 was 3.69. In 2005, the full-time teaching faculty of the University numbered approximately 3,500 members.

Message from the President Mark Emmert



A university is a community of scholars and artists, a place where faculty and students communicate with each other to enrich human understanding. Universities have played an essential role in societies for hundreds of years, promoting learning and culture, generating new knowledge, and training professionals in specialized calling. The University of Washington is one of the finest universities in the world.

It is also an exciting place to be, with a lively interplay of teaching, research, and public service. Its contributions to the state, the nation, and the world will continue to grow as we face the challenges of the twenty-first century.

ACADEMIC CALENDAR

2006-2007

Autumn Quarter 2006

Classes begin September 27
Last day of instruction December 8
Final examinations December 11-15

Winter Quarter 2007

Classes begin January 3
Last day of instruction March 9
Final examinations March 12-16

Spring Quarter 2007

Classes begin March 26
Last day of instruction June 1
Final examinations June 4-8
Commencement June 9

Summer Quarter 2007

Full-term and term a classes begin June 18
Term a classes end July 18
Term b classes begin July 19
Full-term and term b classes end August 17

2007-2008

Autumn Quarter 2007

Classes begin September 26
Last day of instruction December 7
Final examinations December 10-14

Winter Quarter 2008

Classes begin January 7
Last day of instruction March 14
Final examinations March 17-21

Spring Quarter 2008

Classes begin March 31
Last day of instruction June 6
Final examinations June 9-13
Commencement June 14

Summer Quarter 2008

Full-term and term a classes begin June 23
Term a classes end July 23
Term b classes begin July 24
Full-term and term b classes end August 22

Dates in this calendar are subject to change without notice. A detailed calendar with the latest information on registration can be found online at www.washington.edu/students/

For directory assistance,
call the University switchboard, (206) 543-2100.
Address correspondence to:
University of Washington
(Name of office and box number)
Seattle, Washington 98195

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration; the instruction in and the graduation from the University and its various divisions; and any other regulations affecting the student. The University also reserves the right to withdraw courses and programs at any time.

It is the University's expectation that all students follow University regulations and procedures as they are stated in the General Catalog. Appeals may be filed with the student's dean or with the Vice President for Student Affairs in nonacademic matters. Students are expected to observe the standards of conduct contained in the Student Conduct Code (WAC 478-120).

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Role and Mission of the University

Founded 4 November 1861, the University of Washington is one of the oldest state-supported institutions of higher education on the Pacific coast. The University is comprised of three campuses: the Seattle campus is made up of seventeen schools and colleges whose faculty offer educational opportunities to students ranging from first-year undergraduates through doctoral-level candidates; the Bothell and Tacoma campuses, each developing a distinctive identity and undergoing rapid growth, offer diverse programs to upper-division undergraduates and to graduate students.

The primary mission of the University of Washington is the preservation, advancement, and dissemination of knowledge. The University preserves knowledge through its libraries and collections, its courses, and the scholarship of its faculty. It advances new knowledge through many forms of research, inquiry and discussion; and disseminates it through the classroom and the laboratory, scholarly exchanges, creative practice, international education, and public service. As one of the nation's outstanding teaching and research institutions, the University is committed to maintaining an environment for objectivity and imaginative inquiry and for the original scholarship and research that ensure the production of new knowledge in the free exchange of facts, theories, and ideas.

To promote their capacity to make humane and informed decisions, the University fosters an environment in which its students can develop mature and independent judgment and an appreciation of the range and diversity of human achievement. The University cultivates in its students both critical thinking and the effective articulation of that thinking.

As an integral part of a large and diverse community, the University seeks broad representation of and encourages sustained participation in that community by its students, its faculty, and its staff. It serves both non-traditional and traditional students. Through its three-campus system and through educational outreach, evening degree, and distance learning, it extends educational opportunities to many who would not otherwise have access to them.

The academic core of the University of Washington is its College of Arts and Sciences; the teaching and research of the University's many professional schools provide essential complements to these programs in the arts, humanities, social sciences, and natural and mathematical sciences. Programs in law, medicine, forest resources, oceanography and fisheries, library science, and aeronautics are offered exclusively (in accord with state law) by the University of Washington. In addition, the University of Washington has assumed primary responsibility for the health science fields of dentistry and public health, and offers education and training in medicine for a multi-state region of the Pacific Northwest and Alaska. The schools and colleges of architecture and urban planning, business administration, education, engineering, nursing, pharmacy, public affairs, and social work have a long tradition of educating students for service to the region and the nation. These schools and colleges make indispensable contributions to the state and, with the rest of the University, share a long tradition of educating undergraduate and graduate students toward achieving an excellence that well serves the state, the region, and the nation.

BR, February 1981; revised February 1998; December 2001

Non-Discrimination policy

The University of Washington reaffirms its policy of equal opportunity regardless of race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran. This policy applies to all programs and facilities including, but not limited to, admissions, educational programs, employment, and patient and hospital services. Any discriminatory action can be a cause for disciplinary action. Discrimination is prohibited by Presidential Executive Order 11246 as amended; Washington State Gubernatorial Executive Orders 89-01 and 93-07; Titles VI and VII of the Civil Rights Act of 1964; Washington State Law Against Discrimination RCW 49.60; Title IX of the Education Amendments of 1972; State of Washington Gender Equity in Higher Education Act of 1989; Sections 503 and 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990; Age Discrimination in Employment Act of 1967 as amended; Age Discrimination Act of 1975; Vietnam Era Veterans' Readjustment Act of 1972 as amended; other federal and state statutes, regulations; and University policy. Coordination of the compliance efforts of the University of Washington with respect to all of these laws and regulations is under the direction of the Assistant Provost for Equal Opportunity, Dr. Helen Remick, University of Washington, Equal Opportunity Office, Box 354560, 4045 Brooklyn Avenue Northeast, Seattle, WA 98195, 206-685-3263/V or 543-6452/TTY.

Additional information concerning the equal opportunity and affirmative action policies and procedures, including complaint procedures, is in the Operations Manual, D46.1, D46.2, D46.3, and D46.4, and the UW Handbook, Vol. IV, p. 44.

Information on reasonable accommodation for students with disabilities is available from the following offices: for classroom and academic-related accommodation, call Disabled Student Services, 206-543-8924/V, 206-543-8925/TTY, or email at uwdss@u.washington.edu; for other non-academic related information and accommodation, call Disability Services Office, 206-543-6450/V, 206-543-6452/TTY, or email at access@u.washington.edu.

Accreditation

The University of Washington is accredited by the Northwest Association of Schools and Colleges and is a member of the Association of American Universities. Individual schools and colleges are members of the various accrediting association in their respective fields. Currently enrolled or prospective students should contact the Office of the Registrar to review accreditation documents for the University and the respective departments to review programmatic accreditation documents.

Please Note:

**Due to file
corruption, pages 6
through 10 of this
edition of the
General Catalog
are currently not
available.**

student does not officially withdraw. Grades in the range 0.6 to 0.1 may not be assigned. Grades reported in this range are converted by the Office of the Registrar to 0.0. Numerical grades may be considered equivalent to letter grades as follows:

A	4.0-3.9	
A-	3.8-3.5	
B+	3.4-3.2	
B	3.1-2.9	
B-	2.8-2.5	
C+	2.4-2.2	
C	2.1-1.9	
C-	1.8-1.5	
D+	1.4-1.2	
D	1.1-0.9	
D-	0.8-0.7	Lowest passing grade.
E	0.0	Academic failure. No credit earned.

Additional information on grades and scholarship rules may be obtained from the Graduation and Academic Records Office, 264 Schmitz.

The following letter grades also may be used:

N Indicates that the student is making satisfactory progress and a final grade will be given at the end of the quarter the work is completed. Used only for thesis, research, and hyphenated courses (courses not completed in one quarter) and courses numbered 600, 601, 700, 750, and 800. An "N" grade carries with it no credit or grade until a regular grade is assigned.

I Incomplete. An Incomplete is given only when the student has been in attendance and has done satisfactory work until within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control. A written statement of the reason for the giving of the Incomplete, listing the work which the student will need to do to remove it, must be filed by the instructor with the head of the department or the dean of the college in which the course is given.

To obtain credit for the course, an undergraduate student must convert an Incomplete into a passing grade no later than the last day of the next quarter. For Spring Quarter, the following quarter is considered to be Fall Quarter. *The student should never reregister for the course as a means of removing the Incomplete.* An Incomplete grade not made up by the end of the next quarter is converted to the grade of 0.0 by the Office of the Registrar unless the instructor has indicated, when assigning the Incomplete grade, that a grade other than 0.0 should be recorded if the incomplete work is not completed. The original Incomplete grade is not removed from the permanent record.

An instructor may approve an extension of the Incomplete removal deadline by writing to the Graduation and Academic Records Office no later than the last day of the quarter following the quarter in which the Incomplete grade was assigned. Extensions, which may be granted for up to three additional quarters, must be received by the Office of the Registrar before the Incomplete has been converted into a failing grade.

In no case can an Incomplete received by an undergraduate be converted to a passing grade after a lapse of one year.

In no case shall an Incomplete on the record at the time a degree is granted be subsequently changed to any other grade.

An Incomplete grade does not count for registered hours nor in computation of grade-point averages.

For DL-suffix courses that do not follow the quarter schedule, an Incomplete shall be given only when the student has done satisfactory work to within two weeks of the maximum term for completion of the course, as specified at the time of registration. In order to obtain credit for the course, a student must convert an Incomplete into a passing grade by the end of the quarter following the one in which the Incomplete was given. All other provisions and deadlines of subsections a. through d. shall also apply.

S Satisfactory grade for courses taken on a satisfactory/not-satisfactory basis. An S grade is automatically converted from a numerical grade of 2.0 or above for undergraduates. The grade S may not be assigned directly by the instructor, but is a grade conversion by the Office of the Registrar. Courses so graded can only be used as free electives and cannot be used to satisfy a University, college, or department course requirement. S is not computed in GPA calculations.

NS Not-satisfactory grade for courses taken on a satisfactory/not-satisfactory basis. A grade less than 2.0 for undergraduates is converted to NS. NS is not included in GPA calculations. No credit is awarded for courses in which an NS grade is received.

CR Credit awarded in a course offered on a credit/no-credit basis only or in courses numbered 600, 601, 700, 750, and 800. The minimum performance level required for a CR grade is determined, and the grade is awarded directly, by the instructor. CR is not computed in GPA calculations.

NC Credit not awarded in a course offered on a credit/no-credit basis only or in courses numbered 600, 601, 700, 750, and 800. The grade is awarded directly by the instructor and is not included in GPA calculations.

W Official withdrawal or drop from a course after the fourteenth calendar day of the quarter through the seventh week, to be followed by a number representing the week in which the course was dropped. An official withdrawal is not computed in GPA calculations. Students who do not officially drop a course(s) will receive a grade of 0.0. For DL-suffix courses that do not follow the quarter schedule, the grade W shall be assigned to any course dropped after the fourteenth calendar day after the start of the course and more than two weeks before the end of the maximum term for completion of the course, as specified at the time of registration. The date of withdrawal shall be noted on the transcript.

HW Grade assigned when a student is allowed a hardship withdrawal from a course after the fourteenth calendar day of the quarter. HW grades are not computed in GPA calculations.

Nontraditional Grading Options

Credit/No Credit—Only as a Course Option

With appropriate departmental review and approval, a course may be offered on a credit/no credit-only basis. The standard for granting credit in credit/no credit-only courses under this option is the demonstration of competence in the material of the course to the instructor's satisfaction.

Satisfactory/Not-Satisfactory Grading Option

You may elect to take certain courses on a satisfactory/not satisfactory (S/NS) basis.

When registering through Personal Services on MyUW, select the Grade Option box. The S/NS grade option can be elected through the end of the Late Course Drop Period. A \$20 fee is charged beginning the eighth calendar day of the quarter.

As an undergraduate, a course in which an “S” is earned may not be used to satisfy any department, college, or University requirement, except that the credits may be applied to the minimum of 180 credits required for graduation. Each instructor will report numerical grades to the Registrar, who will convert satisfactory grades (2.0 or greater) to “S”, and unsatisfactory grades (less than 2.0) to “NS” for the student’s transcript. No more than 25 S/NS credits may apply toward an undergraduate degree.

If you are a graduate student and earn grades of 2.7 or above, you will receive a grade of “S” while 2.6 or below are recorded as NS. With the approval of your graduate program adviser or the Supervisory Committee Chairperson, you may elect to take any course for which you are eligible outside of your major academic unit on an S/NS basis.

In cases of withdrawal, the “W” is recorded. Neither “S” nor “NS” is included in the grade-point average.

Grade-Point Average (GPA)

The University’s cumulative GPA is based solely on courses taken in residence at the UW; this includes some, but not all, courses taken through UW Extension. The UW transcript also reflects grades for UW Extension course work that is not residence credit, and the grades for credit by examination. These latter grades do not affect the University cumulative GPA.

Computation of GPA

The GPA for graduation is computed by dividing the total cumulative grade points by the total graded credits attempted for courses taken in residence at the University. Grade points are calculated by multiplying the number of credits by the numeric value of the grade for each course. The sum of the grade points is then divided by the total graded credits attempted. Courses elected on an S/NS basis are counted as follows: Satisfactory grades are printed on the permanent record as an S and do not count in the quarterly or cumulative GPA, but they do count as credits earned toward graduation. Not-satisfactory grades, NS, do not count in the quarterly and cumulative GPA and do not count as credits earned toward graduation.

EXAMPLE 1

Course Points	Credits	Grade	Grade
CLAS 205	3	CR	
OCEAN 101	5	2.7	= 13.5
HIST 111	5	4.0	= 20.0
SCAND 100	2	3.3	= 6.6
Total credits earned toward graduation	15		
Total graded credits attempted	12		40.1

$$\text{GPA} = 40.1 \div 12 = 3.34$$

The total graded credits attempted, not the credits earned toward graduation, are used in computing the GPA.

EXAMPLE 2

Course Points	Credits	Grade	Grade
ENGL 121	5	2.3	11.5
OCEAN 101	5	0.0	= 0.0
SPHSC 100	3	2.7	= 8.1
ART 121	5	I	= 0.0
Total credits earned toward graduation	8		
Total graded credits attempted	13		19.6

$$\text{GPA} = 19.6 \div 13 = 1.51$$

The student attempted 18 credits, but only 13 are graded, because the Incomplete (I) is not computed in the GPA. The 0.0 for OCEAN 101 is computed in the GPA, but no credit is awarded toward graduation.

If the work in ART 121 is not made up by the end of the next quarter, the I is converted to a numeric grade and the GPA is recomputed.

Repeating Courses

Undergraduates

With the approval of the academic department offering the course, an undergraduate may repeat a course once. Both the original grade and the second grade are computed in the GPA but credit is allowed only once. Veterans receiving benefits must receive approval from the Office of Special Services before a course is repeated.

Graduates

Graduate students may repeat any course. Both the original grade and the second grade are computed in the GPA. Subsequent grades will not be included, but will appear on the permanent record. The number of credits earned in the course will apply toward degree requirements only once. Veterans receiving benefits must receive approval from the Office of Special

Services before a course is repeated.

Grading Procedures

Change of Grade

Except in case of error, no instructor may change a grade that he or she has turned in to the Registrar. Grades cannot be changed after a degree has been granted.

Grade Appeal Procedure

A student who believes he or she has been improperly graded must first discuss the matter with the instructor. If the student is not satisfied with the instructor’s explanation, the student, no later than ten days after his or her discussion with the instructor, may submit a written appeal to the chair of the department, or in a nondepartmental college, to the dean, with a copy of the appeal also sent to the instructor. Within ten calendar days, the chair or dean consults with the instructor to ensure that the evaluation of the student’s performance has not been arbitrary or capricious. Should the chair believe the instructor’s conduct to be arbitrary or capricious and the instructor declines to revise the grade, the chair (or the dean in a nondepartmental school or college), with the approval of the voting members of his or her faculty, shall appoint an appropriate member, or members, of the faculty of that department to evaluate the performance of the student and assign a grade. The dean and Provost should be informed of this action.

Once a student submits a written appeal, this document and all subsequent actions on this appeal are recorded in written form for deposit in a department or college file.

Grade Reports

Grades are not mailed. You may display and print a grade report through MyUW.

Student Life and Student Services

Office of the Vice President for Student Affairs

The Division of Student Affairs assists the University in fulfilling its academic mission by providing a broad range of services and programs designed to further the educational and personal development of students. The Division consists of ten units: Admissions and Records, Center for Career Services, Student Counseling Center, Disabled Student Services, Housing and Food Services, Recreational Sports Programs, Student Financial Aid, Student Publications, and Student Activities and Union Facilities.

Students are encouraged to contact the Office of the Vice President for Student Affairs, (206) 543-4972, 476 Schmitz, for information concerning various aspects of extra-class life at the University.

Center for Career Services

The University's Center for Career Services, which includes a Minority Job Placement Program, offers career information and services to assist undergraduates, graduate students, and alumni (1) to make a viable connection between their academic backgrounds and their career or long-range employment objectives, (2) to develop effective job-seeking strategies, and (3) to find suitable employment upon leaving the University or to change employment thereafter.

A variety of programs are offered and include individual and group career counseling, career options and job-search seminars, employer and alumni career panels, mock interviews a résumé database, career-related internships and career fairs, credential files, online job listings, campus interviews, employee information, and student employment listings (including on-campus jobs). Students may also send questions to ccscnslr@u.washington.edu.

Students are encouraged to begin using the services of the Center early in their academic careers. This is best accomplished by visiting the Center at 134 Mary Gates Hall or calling (206) 543-0535 to make an appointment with a career counselor. The Center also maintains a Web site at depts.washington.edu/careers/.

Childcare Program

The Childcare Program provides eligible student-parents with direct financial assistance to purchase services at licensed childcare facilities in the Seattle-King County area. To apply, students must submit the Free Application for Federal Student Aid (FAFSA) to the designated processor by the end of February each year and a Childcare Request Application to the Childcare Office, 482 Schmitz, before the end of May each year. Brochures describing the program are available at the Childcare Office, (206) 543-1041.

Student Counseling Center

All currently enrolled, matriculated students at the University may make use of the services of the Student Counseling Center and its staff of psychologists and counselors to discuss educational

progress, personal concerns, or career goals. Individual, couples, and group counseling is provided for a variety of issues including academic, career, personal, and social issues. Because of the number of students seeking help, the Center offers only short-term therapy. Psychological tests, when necessary, are provided as part of the Center's counseling service. Workshops on special topics such as test anxiety, time management, test taking, note taking, and stress management are available.

There is a \$15 fee for the first assessment appointment, which is provided to determine if the Student Counseling Center's services are appropriate. Individual appointments after the first visit currently cost \$30 each. For students financially unable to pay the fee, an extended-payment plan is offered. The Center is located on the fourth floor of Schmitz Hall, (206) 543-1240. Additional information may be found at the Center's Web site.

Disabled Student Services

The University is committed to ensuring facility and program access to students with either permanent or temporary physical, sensory, or psychological disabilities through a variety of services and equipment. The Disabled Student Services (DSS) Office coordinates academic accommodations for enrolled students with documented disabilities. Accommodations are determined on a case-by-case basis and may include classroom relocation, sign language interpreters, recorded course materials, note taking, and priority registration. DSS also provides needs assessment, mediation, referrals, and advocacy as necessary and appropriate. Requests for accommodations or services must be arranged in advance and require documentation of the disability, verifying the need for such accommodation or service.

Technical and adaptive equipment is available through both DSS and Computing and Communications. Information about adaptive-technology computer software and equipment and their locations on campus may be obtained from DSS. Publications include *Access Guide for Persons with Disabilities*, (showing classroom access, elevator locations, ramps, parking, and restrooms), and the *Campus Mobility Route Map*, as well as other publications.

To the maximum extent possible, students with disabilities are integrated into the general student population and their problems are solved through the usual channels. Various other departments offer additional services: the Transportation Department provides free on-campus transportation with wheelchair lifts for students with mobility limitations through Dial-a-Ride, (206) 685-1511, and UW Night Ride, (206) 799-4151 after 6 p.m.

Additional information is available from Disabled Student Services, 448 Schmitz, Box 355839, (206) 543-8924 (Voice), (206) 543-8925 (TTY), uwdss@u.washington.edu.

Freshman Convocation

Freshman Convocation is an academic ceremony involving the President of the University, other administrators, student leaders, and members of the Board of Regents and the faculty, to welcome and honor new freshmen and their families. It is held annually on the Sunday preceding the first day of autumn quarter. The President presides over the ceremony, which features remarks by a distinguished member of the faculty. Neither tickets nor reservations are required for the Convocation. Formal invitations are mailed in mid-August. A no-host brunch, which requires tickets, is held in the Student Union Building (HUB) and precedes the Convocation.

Student Health Insurance Program

An accident and sickness insurance plan is available to matriculated University students (Seattle campus) and dependents on a voluntary basis. A student may enroll in the plan at the time of

registration through the seventh calendar day of each quarter. The appropriate premium is paid by the quarterly tuition due date. Brochures describing the insurance eligibility, coverage, and costs are available at the Student Insurance Office, 469 Schmitz, (206) 543-6202; Hall Health Primary Care Center; and the HUB.

The University also sponsors a field-trip accident insurance plan. Application forms may be requested from the Risk Management Office, 22 Gerberding, Box 351276, (206) 543-3419.

Insurance for Foreign Students

All students from foreign countries are required to have a health-and-accident insurance policy in force while registered at the University. This may be achieved by purchasing either the student accident and sickness insurance offered through the University or other coverage, proof of which must be furnished to the International Services Office and for which an insurance waiver must be obtained. To avoid cancellation of registration, international students must pay tuition and either pay for the University-sponsored insurance or have a waiver on file by the tuition due date.

International Services Office

The International Services Office provides assistance to international students, scholars, and faculty in meeting United States Immigration and Naturalization Service regulations dealing with such matters as maintaining lawful status, extensions of stay, transfers of schools/programs, and working authorizations. The Office also provides a formal orientation to the campus and community for new international students and visiting faculty; advice and counsel for educational, financial, and personal problems; and dissemination of important and timely information through newsletters and workshops. The Office is located in 459 Schmitz, (206) 543-0841.

Office of Special Services

The Office of Special Services, 460 Schmitz, assists students eligible for veterans' educational benefits, advises and monitors students who must meet English As A Second Language requirements, and administers certain tuition-reduction programs (see Procedures and Fees section).

Office of Student Financial Aid

The Office of Student Financial Aid, 105 Schmitz, administers federal, state, and private financial aid programs designed to help students pay for their education. Assistance is offered in the form of grant aid, scholarships, long-term loans that must be repaid after leaving school, and work opportunities. Information describing the different programs, eligibility criteria, and application procedures may be viewed at www.washington.edu/students/osfa or may be obtained by calling (206) 685-9535.

To be eligible for financial aid, an individual must be a citizen or permanent resident of the United States and be admitted to the University as a matriculated, degree-seeking student. Priority consideration is given to students who apply before the University's financial aid application deadline of February 28 (e.g., February 28, 2002, for the academic year beginning in September 2002).

The Office of Student Financial Aid also administers a short-term loan program for full-time students who find themselves in temporary financial difficulty. University students may take advantage of the short-term loan program without applying for financial aid.

Student Legal Services

Student Legal Services (SLS) provides legal advice, counseling, negotiating, and court representation in many civil and criminal matters. All currently enrolled undergraduate and graduate

students at UW Seattle are eligible for a free initial consultation. If additional services are needed, there is an hourly charge of \$15, plus a \$10 office supply fee. Students are responsible for court costs, if any. The office is staffed by third-year law students supervised by licensed attorneys. To make an appointment or learn more about SLS, call (206) 543-6486 or visit the office, 31 Brooklyn Building, Box 354563, 4045 Brooklyn Avenue NE. No legal advice is given over the phone.

Student Publications

Student publications at the University include *The Daily* and the *Student Directory*. *The Daily* is published Monday-Friday throughout the academic year and is distributed in the mornings on campus without charge. During summer quarter, *The Daily* is published once a week. Any student with an interest in journalism may serve on *The Daily* staff.

Student Union Facilities

The Husky Union Building (Student Union Building) and the South Campus Center are the principal centers of student activities and programs on the campus.

Husky Union Building

The Husky Union Building (HUB), located in the center of campus, houses a variety of facilities and services for students, and faculty and staff members. These include lounges, a 478-seat auditorium, a multipurpose ballroom, a barber and hair-styling shop, a branch of the University Book Store, several retail food operations, a study/music lounge with email access, a lost-and-found office, a ticket sales office, a newsstand, a self-service post office, a limited-service bank, three cash machines, a number of student-organization offices, and a games area which includes a twelve-lane bowling center. Meeting rooms accommodating from 10 to 175 persons are available for registered student organizations.

South Campus Center

The South Campus Center, located on the shore of Portage Bay, serves as the central meeting place for students and faculty on the southern end of campus. Facilities and services similar to those in the HUB are available and include meeting and conference rooms, display cases, a hair-styling shop, amusement games, a cash machine, a branch of the University Book Store, a newsstand, and lounges with beautiful views of Portage Bay.

Student Activities and Organizations

Student Activities Office

The services provided by the Student Activities Office (SAO) include assisting student organizations in understanding University policies and procedures, providing technical help in the planning and conduct of student events, and furnishing information and assistance in order that they may represent themselves and their interests in an effective manner. Advisers are available to assist students involved in group activities with budget and program planning, advertising, orientation to campus resources, and leadership and organizational skill development. Underlying the SAO service functions is a desire to provide an environment in which students can learn from their experiences in extracurricular activities as a supplement to their classroom experiences. Additional information about the services is available from the Student Activities Office, 207 HUB, (206) 543-2380.

Student Organizations

Students at the University are encouraged to become active in at least one of the campus's approximately 450 voluntary student organizations, which include honorary, professional, and social organizations; service clubs; activity groups; and religious and fraternal organizations. Voluntary student organizations that register with the University receive various benefits and services to assist their respective activities. Additional information is available from the Student Activities Office, 207 HUB, (206) 543-2380.

Associated Students of the University of Washington

The Associated Students of the University of Washington (ASUW) is a voluntary, nonprofit association of students designated by the University Board of Regents to carry out a variety of student activities and to represent student interests. In order to vote in ASUW elections, hold ASUW office, or be employed by the ASUW, a student must be a member of the ASUW. Membership is open to all students by providing an affirmative answer on the University registration form each quarter.

The ASUW has an annual budget of approximately \$1 million, supported by the services and activities fee paid as part of tuition and from program revenue. The government of the ASUW is headed by an eleven-member board of directors elected by the student body each year, and one representative from the Graduate and Professional Student Senate. The ASUW maintains agencies and service groups to provide students with a varied program of activities during the school year and nominates students for service on a number of University committees. ASUW services include the Experimental College, a bicycle repair shop, and an ongoing film and entertainment series. Questions regarding the ASUW and its services should be directed to either the ASUW Office, 204L HUB, (206) 543-1780, or the Student Activities Office, 207 HUB, (206) 543-2380.

Recreational Sports

The Department of Recreational Sports Programs provides a comprehensive program of more than seventy sports and fitness activities designed to meet the diverse needs and interests of students. To provide this service, the department manages recreation facilities that include the Intramural Activities Building (IMA), Golf Driving Range, Waterfront Activities Center (canoe rentals), outdoor facilities (Denny Field and tennis courts), Hutchinson Hall swimming pool and locker rooms, and the practice Climbing Rock. Programs and facilities are open to students with a valid student identification card (Husky card).

For additional information call the telephone numbers listed below, or visit the Recreational Sports Web site at depts.washington.edu/ima/.

Intramural Activities Building: The IMA is located north of Husky Stadium and south of parking lot E1. The IMA includes activity space for basketball, volleyball, badminton, swimming, squash, racquetball, handball, martial arts, aerobics, archery, and roller skating. The IMA has a fitness center with free weights, weight machines, and cardiovascular machines. Located near the IMA are 13 tennis courts (seven are night lit), and three multipurpose sports fields for flag football, softball, soccer, rugby, lacrosse, ultimate, and other outdoor activities. For more information, contact the IMA at (206) 543-4590 or ima@u.washington.edu.

The **fitness center** is equipped with 18 climbers, 24 treadmills, 12 recumbent cycles, 12 stationary cycles, 21 cross trainers, six

ergometers, 62 single-station weight machines, 40 strength benches, a step mill, and Olympic weights, including barbells and dumbbells.

Sports Skills Instruction: Recreational Sports offers non-credit classes in Aikido, aerobics, step aerobics, hydro-aerobics, deep-water fitness, Abs, body composition, conditioning, first aid and CPR, golf, judo, karate, kung fu, racquetball, rock climbing, rowing, scuba diving, ski conditioning, snow skiing/snowboarding (indoor), squash, swim conditioning, swimming, tae kwon do, tai chi, tennis, weight training, and yoga. For more information, call Sports Skills Instruction at (206) 543-2571.

Club Sports: Recreational Sports offers club sports, including Aikido, archery, climbing, cycling, equestrian, fencing, ice hockey, judo, karate, kayaking, kendo, kung fu, lacrosse (men's and women's), rowing, rugby, sailing, scuba diving, snow skiing, soccer, tae kwon do, ultimate Frisbee (men's and women's), volleyball (men's and women's), and water polo (men's and women's). For more information, contact Club Sports at (206) 543-9499.

Intramural Sports are offered for men, women, and men and women combined in a variety of activities, including basketball, bowling, crew, flag football, inner-tube basketball, soccer, softball, swimming, tennis, track and field, ultimate Frisbee, and volleyball, as well as special events. For more information, call Intramural Sports at (206) 543-8558.

The **Golf Driving Range** is located at the foot of the 45th Street viaduct and is the center for all golf activities on campus. The facilities include 43 hitting tees, and two putting and chipping greens, and are open seven days a week. Group lessons are available for beginning players. For more information, contact the Golf Driving Range at (206) 543-8759 or seagren@u.washington.edu.

Waterfront Activities Center (WAC): The campus center for water sports (e.g., canoe rentals, sailing, kayaking, rowing) is located at the WAC southeast of Husky Stadium. The WAC offers locker rooms with saunas, private boat storage for non-motorized craft, and group rental of the lounge and meeting rooms. The facility is open from 10 a.m. to dusk, seven days a week. For more information, contact the WAC at (206) 543-9433 or h2o@u.washington.edu.

Student Rights and Responsibilities

Student Conduct Code

The University Board of Regents has adopted a *Student Conduct Code*, which applies to both the academic and nonacademic conduct of students while they are attending the University. The *Code* specifies standards of conduct, jurisdiction for hearing disciplinary matters, and due-process procedures. Students may obtain copies of the code through either their advisers or the Office of the Vice President for Student Affairs, 476 Schmitz.

Computer Use Policy

All faculty, staff, and students who use any computer at the University are responsible for using computer resources in an ethical and legal manner. For example, it is not appropriate to share computer accounts or use them for commercial purposes, to send unwanted email, or to distribute copyrighted software, music, or images. Those who do not follow the rules could lose their UW computing privileges. For detailed information see the Web, or contact Computing and Communications Information at (206) 543-5970.

University Policy on Student Education Records

A copy of the University's policy on a student's right to inspect his or her education records and the University's responsibility to maintain the confidentiality of such records is located at each departmental reference station. The policy is filed under the Washington Administrative Code 478-140-010. Copies of the policy are available at the Registration Office, 225 Schmitz.

Sexual Harassment Complaint Procedure

Students, staff, faculty, and other users of University services who have a concern or complaint regarding sexual harassment may contact either the Ombudsman for Sexual Harassment, (206) 543-0283, or the University Complaint Investigation and Resolution Office, (206) 616-2028. Personnel in these offices provide assistance in resolving concerns and complaints. Also, University staff may contact their human resources representative about sexual harassment concerns.

Office of Minority Affairs

Fostering diversity is the ongoing work of the entire University, but it is a special responsibility of the Office of Minority Affairs (OMA). To this end, OMA provides a variety of services to undergraduates from underrepresented and economically and educationally disadvantaged backgrounds. These services include a statewide **Recruitment and Outreach Office** whose staff provides assistance with the admissions and financial aid process in high schools and community colleges throughout Washington state. Through its **Counseling Center**, OMA offers academic advising, financial aid advocacy, housing assistance, and other services related to life on campus. OMA's services are available mainly to students who, following admission, are invited to become members of the Educational Opportunity Program (EOP). Participation in EOP is limited to students who are U.S. citizens or permanent residents, with priority given to Washington state residents. OMA's other services, described below, are open to EOP participants and other students as resources permit.

OMA's Instructional Center (IC) offers wide-ranging academic assistance to students in the Educational Opportunity Program and to others as staffing, time, and space permit. The IC maintains drop-in centers for mathematics, writing, reading and study skills, physics, engineering, chemistry, biology, the natural sciences, and foreign languages. Students are assisted in a variety of settings, such as group instructional workshops, review sessions, adjunct courses, credit and non-credit classes, and one-on-one tutorials.

Student Support Services (SSS) is a counseling and instructional-assistance program for selected UW undergraduates who meet the program's economic and educational eligibility requirements. SSS helps students adjust to campus, as well as encourages and assists them in discovering and taking advantage of the UW's many academic and personal opportunities. SSS also provides tutorial and academic-support workshops to help students move successfully to upper-division courses or into the Early Identification Program's graduate-school preparation services.

The Early Identification Program (EIP) is a graduate- and professional-school preparation program for qualified students interested in earning advanced degrees. The **McNair Achievement Program** is a federally funded scholarship program designed to encourage and prepare low-income and first-generation college students and underrepresented students in graduate education, for the Ph.D. degree. Through their advising and academic-enrichment services, EIP and McNair encourage students to aim for doctoral degrees and faculty careers. These

services include an introduction to the research process, research opportunities in collaboration with faculty mentors, scholarships and internships, access to special seminars and workshops, as well as advice and assistance with the graduate school admissions and financial aid process.

The Ethnic Cultural Center (ECC) is a facility for student-organized events and activities. Twenty-two of the University's student organizations use the ECC as their center of activity. The staff of the Center offers students opportunities for the development of organization and leadership skills through the planning and implementation of cultural, social, and student-government programs. The Ethnic Cultural Center complex also maintains an outstanding theatre which provides opportunities for students interested in participating in or creating on-stage productions and other events.

Outreach to Middle and High Schools. The Office of Minority Affairs collaborates widely with other UW pre-college partnership programs to strengthen the University's diversity "pipeline" from the K-12 schools. OMA itself maintains several middle- and high-school outreach programs whose aim is to increase the number of students who are taking college-prep classes by the ninth grade, improve the academic performance and the college-going rates of underrepresented and disadvantaged students. These services offer UW students a variety of volunteer, UW-credit, or paid opportunities. **Upward Bound** provides strong academic and other college-readiness services for selected Seattle high school students from Seattle's Nathan Hale, Cleveland, and Franklin High Schools who are from low-income or first-generation college families. The Office of Minority Affairs is a partner with middle schools and community organizations in the Yakima Valley and Seattle in the management of college-readiness **Gear Up** programs. The **Early Scholars Outreach Program** helps students begin preparation for college while they are still in middle school. **Educational Talent Search** offers counseling and encouragement to middle- and high-school students in targeted western and eastern Washington schools. It focuses particularly on the transition from high school to postsecondary education. OMA, working with UW students and several Seattle high schools, provides inner-city students with tutoring, mentoring, and classroom assistance through the **OMA High School Tutor/Mentor Program**. OMA in partnership with the Seattle School District offers a **Middle College High School Program** experience on campus to a selected group of non-traditional high school students.

The office of the Vice President for Minority Affairs and many of OMA's services are located on the third floor of Schmitz Hall. For information about OMA's program locations and services, call (206) 685-0774.

Registration Policies

Full-time Requirements

You should register for 12 or more credits to be considered full-time if you are an undergraduate or professional student. If you are a graduate student, you should register for 10 or more credits. It is important to note that differing criteria and standards for full-time enrollment exist for eligibility in certain programs. Consult the Financial Aid Office for its requirements on satisfactory student progress. The tuition schedule does not reflect full-time credit requirements for loan deferments, teaching assistantships or other programs.

Class Attendance

If you do not attend regularly scheduled class meetings during the first week of the quarter, you are subject to being dropped at the discretion of the teaching department to allow enrollment space for other students. Affected courses should be identified in the Time Schedule and/or posted in departmental offices. Do not assume that departments will automatically drop you from the course if you do not attend. If you are not going to go to class, you should drop the course through the registration system. Students who are registered for a course section but do not attend will be assigned a failing grade by the instructor. You may not attend a University course in which you have not been officially registered after the first two weeks of the quarter.

An instructor may allow you to attend his or her class only if your name appears on the official class list from Office of the Registrar. A faculty member may attend informally with the approval of the instructor.

Satisfactory Progress

If you are pursuing a baccalaureate degree, you are expected to make satisfactory progress toward the attainment of that degree and are expected to enter a major and graduate after completion of a reasonable number of credits.

The 105-credit rule

Undergraduates must declare a major by the time they have earned 105 credits or a hold will be placed on their registration until they either declare a major, or meet with an adviser and receive a pre-major extension. The hold is placed on the student record when 105 or more credits have been completed. Transfer students who are admitted to the University with 105 or more credits are expected to declare a major before their second quarter at the UW, or obtain an extension from an adviser.

You will be granted a pre-major extension if your adviser decides that you are pursuing a reasonable goal, and have a good chance of gaining admission to your intended major. The extension will be granted for the number of quarters it should take you to complete the admission requirements of your major.

If your adviser feels that your choice of major is unrealistic, he or she will deny your request for an extension. You will not be allowed to register for subsequent quarters until you can present a reasonable degree plan. Since the intent of the rule is not to drop you from the University but to encourage you to meet with an adviser and plan for an attainable goal, if you need time to consider your options you will usually be given one or two quarters to do so, and then may be allowed additional time if necessary to meet the admission requirements of your new major.

You will receive a warning letter from the University as you approach 105 credits, if you have not yet declared a major. If you

complete 105 credits and are still a pre-major, the registration system will not let you register for the next quarter. To avoid registration delays, meet with the appropriate adviser at least one quarter before you complete 105 credits.

The 210-credit rule

The University's satisfactory progress policy requires students to complete their undergraduate degree programs within 30 credits beyond the minimum required for the degree. Because most degrees require 180 credits, students generally must complete their programs by the time they earn 210 credits. Undergraduates who have completed over 210 credits will be notified by email the third week of the quarter that a hold is being placed on their registration due to lack of satisfactory progress. Students ineligible to graduate will be permitted to register for succeeding quarters only if they receive approval from their department and college after filing a graduation plan. Approval to enroll beyond 210 credits may not extend beyond two additional quarters.

Students receiving satisfactory progress registration holds should immediately contact their departmental academic adviser to file a graduation application or to initiate a satisfactory progress appeal.
Postbaccalaureate students

Postbaccalaureate students are expected to be either preparing for admission into a degree program, seeking an additional baccalaureate degree, or working toward a certificate. If you are admitted as "postbaccalaureate undeclared," you must declare a major by the time you have earned 30 credits beyond your last degree. Once a degree objective has been declared, you must make progress toward that degree as evidenced by courses satisfactorily completed. College advisers may grant extensions beyond the 30-credit limit.

Excessive course repeats and/or drops

The Committee on Admissions and Academic Standards may terminate your enrollment if you have demonstrated lack of academic progress as evidenced by excessive course repeats, course drops, or University withdrawals and cancellations. You may be reinstated with the approval of your college and the Committee. EOP students may be reinstated in consultation with the Office of Minority Affairs.

Registration Tampering

A student who tampers or attempts to tamper with the registration records of another student, including but not limited to dropping courses and adding courses, may be subject to disciplinary sanctions as defined in the Student Conduct Code (WAC 478-120).

Registration Abuse

Web Registration is a personal service. The use of robots and other automated tools to submit registration requests is expressly forbidden.

Residence Halls

Students like the convenience of living in the residence halls (being close to classes and having access to a variety of dining options), but that's just the beginning. Those who live on campus are part of a community that offers opportunities for fun, friendships, personal development and academic success.

Who lives in the residence halls? People just like you live here. But perhaps best of all are the people who live here who have ideas, attitudes and experiences different from yours.

Special Interest Houses

The UW residence halls offer several special interest houses—designated floors in certain halls where residents with common interests live. Residents are encouraged to plan and participate in activities for these houses. If you'd like to live in one of the special interest houses, indicate your preference on your housing application.

Special Interest Houses:

Outdoor House

Outdoor House offers residents the opportunity to plan, participate in and learn outdoor activities such as hiking, biking, skiing, snowshoeing, camping and canoeing. Residents of Outdoor House also share an interest in environmental issues.

International House provides a rewarding environment for those who seek opportunities to share cultural experiences with American and international students, in daily life and through participation in a variety of social and cultural activities.

SAFE House

(Substance and Alcohol Free Environment)

SAFE House offers residents the opportunity to live in a residential community where alcohol and tobacco products are not permitted by its members (regardless of a student's age). The community also features programming and activities that are specific to promoting a substance-free lifestyle. Residents work with Resident Advisers and Resident Directors to create a community that exemplifies an awareness of substance and alcohol abuse issues.

In the other residence hall communities, alcohol use is limited to those of legal age (21) and then only within the confines of a resident's room. The use of illegal substances is strictly prohibited in all residence halls. All halls are 100 percent smoke-free.

Residential FIG

(Freshman Interest Group)

Residential FIG is a specialized program for freshmen which combines academics and life outside class. Students enrolled in a Residential FIG take classes together autumn quarter and live together in the same residence hall for the academic year. New freshmen who have received confirmation for a space in the residence halls are eligible to register. If you are interested in a Residential FIG, visit the FIG website or contact the First Year Programs Office at 206-543-4905.

First Year Experience

First Year Experience offers an environment specifically designed to provide opportunities to assist first-year students in their adjustment to college, often through educational and social programs and floor activities.

Honors House

Honors House is an option for University of Washington Honors Program students who wish to expand their intellectual lives beyond the classroom. Students who choose Honors House have the best of both worlds: close contact with other Honors students and the diversity of the residence halls.

Safety and Security

The University of Washington is a relatively safe place; however, it can be subject to the same problems as the surrounding urban community. The following information describes programs and policies established to protect your safety and well-being.

Residence Hall Patrol

Plainclothes University Police patrol the halls each night from 7 p.m. to 5 a.m. Officers are fully commissioned and have the same authority as other law enforcement officers. RDs and RAs are on duty to handle security issues from 5 p.m. to 8 a.m. and RDs are on duty 24 hours a day on weekends and holidays.

Locked Halls

Residence halls are locked 24 hours a day, except those with food service operations, which remain open from 7 a.m. until 7 p.m. The residence hall desks are staffed from 8 a.m. to 7 p.m. Monday - Friday, 8 a.m. - 5 p.m. on Saturday and 10 a.m. to 5 p.m. on Sunday.

Fire Safety

The fire alarms for all residence halls comply with City of Seattle high-rise fire codes. The systems consist of area-sensitive and building heat and smoke detectors. Each student room contains a smoke/heat detector. Sprinkler systems exist in Terry, Lander, McCarty, McMahon, Haggett and Hansee Halls. Sprinkler systems will be added to Mercer Hall by autumn 2004. All heating and ventilating fans within a facility are interlocked with the fire alarm system for that facility. The system is hardwired directly into the University Police Department, which notifies the City of Seattle Fire Department if problems arise. The University of Washington's Environmental Health and Safety (EHS) department conducts a comprehensive annual inspection of all physical fire safety attributes. In addition, HFS is subject to random inspection by the City of Seattle Fire Department, and semiannual fire drills are conducted in every hall.

Other Safety Measures

- All residence hall rooms have peepholes.
- Women's restrooms are locked.
- Residence hall keys are high-security keys; duplicate keys can only be made using factory equipment.
- Throughout the year residents receive information about safety issues, and Resident Advisers offer programs on personal safety, property protection, emergency procedures and related topics.

Frequently Asked Questions

How do I apply for the residence halls?

The housing application is available online.

Can I apply for housing even if I haven't decided if I will attend the UW?

You are encouraged to apply for housing even if you have not yet decided to attend the University of Washington, because your

assignment will be based on the date we receive your Residence Hall Application, signed contract, and deposit. See the Residence Hall System Contract for specific details.

If you apply for a space in the residence halls and then decide not to attend the University, you will receive a full refund of your deposit if you cancel your application by the appropriate deadline. You are subject to a cancellation fee if you cancel your housing application but still attend the University. See the Residence Hall System Contract for details.

Is housing guaranteed?

We anticipate having enough space for all students who apply for autumn 2005, but cannot guarantee preference.

Who has priority for residence hall space?

The priority system for autumn 2005 is:

- 1 Students who live in the residence halls as of April 1, 2005, and who complete the housing application by April 15, 2005, based on quarters-in-residence.
- 2 New undergraduate students who apply by September 1, 2005, in order of application date.
- 3 Continuing undergraduate students, including returning residents and new undergraduates who apply after their respective deadlines, in order of application date.
- 4 Graduate and professional students, followed by non-matriculated students, in order of application date and on a space-available basis.

*If a Priority 2 waiting list is established, preference may be given to students who live outside commuting distance.

Is there a deadline to apply for housing?

Current residents have until April 15 to apply as a Priority 1. If they miss this deadline, they may still apply as a priority 3. New students may apply at any time.

To what type of room will I most likely be assigned?

New residents will typically be assigned to double or triple rooms, depending on the date their applications are received. A limited number of single rooms may be available to new residents.

Can I get a single room?

Most single rooms are currently filled by returning residents. However, a limited number of single rooms may be available to new residents.

Is my \$300 deposit refundable?

The one-time \$300 deposit is refundable when you permanently move out of the residence halls, and after deductions have been made for any room and board payments due, damage or loss to the room (or cluster in McMahan), and necessary cleaning charges.

What if I decide to cancel my housing application?

If you need to cancel your housing application you may do so in one of three ways:

- 1 Online via the housing application, <https://ucharm.hfs.washington.edu/ucharm>, or
- 2 Email hfsinfo@u.washington.edu from your UW email account, or
- 3 In writing:
University of Washington
HFS Student Services Office
301 Schmitz Hall
Box 355842
Seattle, WA 98195-5842

Please be sure to include your full name and student number in your correspondence.

If you will be attending the University of Washington but no longer need UW housing, you are subject to the cancellation fee schedule in the Residence Hall System Contract.

If you will not be attending the University of Washington and you cancel in writing or email before September 19, 2005, your deposit will be refunded and you will not be charged a cancellation fee.

What should I bring?

- Your residence hall room will be supplied with:
- one satellite TV connection
- one telephone jack
- blinds or draperies
- beds
- desks
- bookcases
- chairs
- dressers
- closets
- wastebaskets
- Ethernet connection

You should bring:

- Bedsheets
- pillows and pillowcases
- blankets/comforter
- towels
- touch-tone telephone (one per room)
- alarm clock

What appliances can I bring?

- The following appliances are allowed:
- Refrigerators under 4.1 cubic feet.
- Blenders and mixers.
- Hot air popcorn poppers.
- Hot pots and coffee pots, which must be placed on non-combustible surfaces such as ceramic tile.
- One microwave oven per room - 700-watt maximum, and no other appliance may be used at the same time.

The following appliances are prohibited:

- Halogen torchieres.
- Space heaters.
- All open-flame appliances (e.g. fondue pots).
- Open-coil appliances (e.g. toasters and toaster ovens).
- Full-size appliances, or multiple appliances that exceed the usage limits of your room.

Should I bring a refrigerator?

You may rent a small refrigerator for your room. The cost for a refrigerator will be \$45 for the academic year (\$30 if the lease is signed winter quarter, \$15 if it is signed spring quarter).

How large are the beds in the residence halls?

The beds in Terry, Lander, McCarty, Haggett, and Hansee Halls, 2104 House and Stevens Court are 36" x 78". The beds in Mercer and McMahan Halls are 33" x 78".

How do I get a parking permit?

You will receive information about parking with your checking-in materials. Please note, however, that parking is very limited and very expensive. A quarterly parking permit for the 2005-06 school year costs \$232.86. Your parking assignment may be in an area that is not close to your hall or you may be placed on a waiting list (most new students are placed on the waiting list). If you don't absolutely need a car, leave it at home. The University has a transportation program called U-PASS which, for \$41 per quarter, offers unlimited rides on buses throughout King and Snohomish counties, as well as other transportation benefits.

Do you have any graduate student housing?

There are a number of housing options available for graduate students:

- Stevens Court single student apartments for students who are 19 and older.
- Stevens Court Addition single and married student

apartments for students who are 20 and older.

- Family Housing communities.
- Private property communities for UW students:
 - Commodore-Duchess
 - Radford Court
 - Nordheim Court

I will be a student in the English Language Program (a.k.a. English as a Second Language Program). Can I live in the residence halls?

Priority for assignment in the residence halls goes first to matriculated University of Washington students. When space permits, we can offer housing to non-matriculated students, such as students in the Extension Program and students in the English Language Program (ELP).

Procedures and Fees

The University and its colleges and schools reserve the right to change the fees, the rules, and the calendar regulating admission and registration; the instruction in and the graduation from the University and its various divisions; and any other regulations affecting the student. The University also reserves the right to withdraw courses and programs at any time.

It is the University's expectation that all students follow University regulations and procedures as they are stated in the *General Catalog*. Appeals may be filed with the student's dean or with the Vice President for Student Affairs in nonacademic matters. Students are expected to observe the standards of conduct contained in the Student Conduct Code (WAC 478-120).

Registration

www.washington.edu/students/reg/regelig.html
Instructions for registration are available on MyUW (myuw.washington.edu) in the Student Personal Services menu by selecting Registration. Notification is emailed to each student quarterly with information about registration for the next quarter.

Registration Period I

www.washington.edu/students/reg/addpolicy.html
Designed to accommodate currently registered matriculated students and students eligible to register under the Quarter Off Eligibility Policy, Registration Period I occurs during the latter half of the quarter preceding the quarter for which the student is registering. However, currently enrolled students registering for autumn quarter do so in spring quarter.

Registration Period II

Registration occurs after Registration Period I closes and is intended primarily to accommodate new and returning students. Continuing students who fail to register during Registration Period I may register during this period. Students who have not completed their initial registration by the end of this period (update and selection of address information, insurance/optional charges, and ASUW membership) are charged a Late Registration Fee.

Registration Period III

All students may register or make course changes during this period. Dropped courses do not appear on the transcript. Students are charged a Change of Registration service fee for registration changes made after Period III. One fee is charged for all changes occurring during the same day. A tuition forfeiture is charged for total credit reductions after Period III if applicable. See Fee Forfeiture section.

Late Add Period

All students may register or make registration changes during this period. All added courses require an entry code or faculty number. A Change of Registration service fee is charged.

Unrestricted Drop Period

www.washington.edu/students/reg/wdpolicy.html
Courses dropped during this period will not appear on the transcript. A Change of Registration fee is charged.

Late Course Drop Period (Annual Drop)

Students may drop one course each academic year (autumn through summer quarters) after the fourteenth calendar day of the quarter through the seventh week of the quarter. A course drop will be recorded on the transcript with a W followed by the number of the week of the drop (W3-W7). A Change of Registration service fee is charged.

Credits Required for Full- or Half-Time Status Requirements

www.washington.edu/students/reg/regpol.html
Some agencies require that a student have full-time status to receive maximum benefits. To be classified as a full-time student by the University, a professional student must register for and complete at least 12 credits per quarter and a graduate student must register for and complete at least 10 credits per quarter. To be classified as a half-time student by the University, a professional student must register for at least 6 credits per quarter and a graduate student must enroll for at least 5 credits per quarter.

Restrictions on Attending Classes

www.washington.edu/students/reg/regpol.html
No person, other than a faculty member attending informally with the approval of the instructor, may attend a University course in which that person has not been registered.

An instructor may allow a student to attend his or her class only if the student's name is on the official class list from the Office of the Registrar. An unregistered student may attend through the fourteenth calendar day of the quarter if the student is on an official wait list for the course.

Adding Courses/Permission Guidelines

www.washington.edu/students/reg/regopt.html
For reasons of public safety and instructional quality, it is important to limit course enrollment to the approved classroom capacity. The Office of the Registrar monitors course enrollment and accepts student registration in fully enrolled courses according to the following guidelines:

1. Through the second week of the quarter, departments may choose to overload courses up to 115% of the room capacity to offset anticipated student course drops and withdrawals as demonstrated by past registration activity.

Students must secure entry codes from instructors or departments to add closed courses. However, if enrollment is at 115% of room capacity, registration requests are denied. Students should be informed when receiving entry codes to overload courses that registration is not guaranteed if enrollment exceeds 115% of room capacity.

If centralized room-capacity records do not correctly reflect the actual seating capacity, notification should be made to the Room Assignments/Time Schedule Office in the Office of the Registrar.

2. Students may add courses during the Late Add Period or through the twenty-first calendar day of the quarter. Adds after the seventh calendar day of the quarter require an entry code or faculty number. Departments may also add students to departmental courses during this period through departmental registration screens. To add courses after this period, students must submit a faculty-approved Late Add Petition form to the Registration Office.

3. A course may not be changed to or from an audit registration after the first two weeks of the quarter. See below for transcript entry.

Dropping a Course

www.washington.edu/students/reg/wdpolicy.html

Students dropping a course during the first two weeks of a quarter shall have no entry on their permanent academic transcript. If all courses are dropped, then a complete withdrawal date is recorded on the transcript.

A course drop made during the third through the seventh weeks of the quarter is recorded on a student's transcript with a W grade and a number designating the week of the quarter in which the course drop was transacted. Only one drop after the fourteenth day of a quarter is permitted each academic year (autumn through summer quarter).

A student who does not officially drop a course through the registration system or the offering department is given a grade of 0.0.

Students receiving or applying for financial aid should check with the Office of Student Financial Aid, 105 Schmitz, 206-543-6101, before dropping a class because it may affect their eligibility.

Students receiving veterans' benefits should contact the Office of Special Services, 460 Schmitz, when dropping courses.

Complete Withdrawal from the University for a Registered Quarter

www.washington.edu/students/reg/wdoffleave.html

Once registered, a student must officially withdraw if he or she later chooses not to attend the University for the registered quarter. Official withdrawal must be made by the fifth day of the quarter for the student to avoid further financial obligation (see Tuition, Fees, and Special Charges for refund information on withdrawals).

1. To withdraw from a quarter, students may complete a Withdrawal Card and submit it in person to the Registration Office, 225 Schmitz, or write to the Registration Office, Box 355850, Seattle, WA 98195-5850. Withdrawal forms are available

at advising offices and the Registration Office. An official withdrawal is effective the day it is received in the Registration Office, or if submitted by mail, the date of the postmark.

2. Students who drop the last course on their schedules will be considered withdrawn for the quarter. Students who drop courses beginning the eighth calendar day of the quarter are charged a Change of Registration service fee per day for any course drops.

3. Submission of a graduate On-Leave application does not constitute official withdrawal from the University.

4. Refer to the grading section in the Graduate School: Graduate Study section.

5. Students receiving veterans' benefits should immediately notify the Office of Special Services of withdrawal.

6. Students with a scholarship or loan awarded through the University should notify Student Fiscal Services.

7. Students who withdraw due to conscription into the armed forces or who are called to active duty military service may be entitled to either a full refund of tuition and fees or academic credit, depending on when in the quarter official withdrawal occurs. Students should contact the Registration Office for complete information.

Additional Information

Address Change

www.washington.edu/students/reg/address.html

Students are responsible for notifying the Office of the Registrar when their address changes. Individual addresses may be viewed and updated through MyUW. (Select Change of Address under the Student Personal Services menu.) A confirmation message will be sent to the student's email address. *The mailing of notices to the last address on record constitutes official notification.*

Residence Classification Requirements

www.washington.edu/students/reg/residency.html

Residence classification information is available from the Graduation and Academic Records Office, 264 Schmitz.

Student Identification Cards

www.washington.edu/students/reg/id.html

All new students should go to the Student ID Card Center, 225 Schmitz, to be issued a permanent student identification card. Photo identification (such as a driver's license, state ID card, or passport) is required to obtain a student ID card. Returning students who have not retained a previous ID card should obtain a new one. A quarterly validation sticker is mailed with the registration confirmation to each registered student. The student ID card with attached validation sticker is used for a variety of campus services. It is the student's means of identifying his or her status as a student at the University.

Registered students whose ID cards have been lost or stolen can have them replaced at the Student ID Card Center. Students who request such replacement are charged a nonrefundable fee. Replacement of cards made invalid by changes in a student's name or rendered unusable by normal wear and tear is provided without charge upon return of the original card to the Student ID Card Center. Two pieces of identification (one with a photo) are required to obtain a replacement card.

Cards that have been tampered with or misused may be confiscated by the University agency or department involved, and the incident may be referred to the Office of the Vice President for Student Affairs for appropriate University action.

Transcripts

www.washington.edu/students/reg/transcripts.html
 Official copies of student academic records at the UW must bear the official seal of the University, the signature of the Associate Registrar, and the date of issue.

Transcript Fee

A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

Transcripts from Other Schools

A transcript covering a student's previous secondary and college education that has been submitted to the University as a requirement for admission becomes part of the official file and is not returned to the student. Any student who desires transcripts of his or her course work undertaken elsewhere must order official transcripts from the institution. The University does not issue or certify copies of transcripts from other institutions.

Veterans and Children of Totally Disabled Veterans and Personnel in the Armed Forces

Information on educational benefits and tuition reduction programs for veterans and their dependents is available from the Office of Special Services, 460 Schmitz.

Veterans and members of the armed forces who apply for admission to the University are subject to the same minimum requirements as regular students and are expected to enroll in accordance with University requirements.

The University's academic programs of study are approved by the Washington State Higher Education Coordinating Board's State Approving Agency (HECB/SAA) for enrollment of persons eligible to receive educational benefits under Title 38 and Title 10 USC.

Tuition, Fees, and Special Charges

Estimated Expenses

The cost of a student's education at the University varies, the amount depending on his or her classification, status as resident or nonresident, and field of study. In computing college costs, a student should consider such additional expenses as insurance coverage, books, and laboratory supplies. Personal expenses (e.g., clothing, laundry, recreation, and transportation), which vary with each individual, as well as between-quarter expenses, should not be overlooked.

Definitions

Lives Away from Home - All single undergraduate students without dependents (spouse or children) who are living away

from parents' home; undergraduate married students without children, whose spouses are also students.

Non-Traditional - Undergraduates who have children; married students whose spouses are not also enrolled students.

Tuition and Fees - Figures presented here are for full-time enrollment, i.e., 10-18 credits per quarter; however, for purposes of financial aid eligibility, full-time is defined as 12 or more credits.

Tuition is due quarterly by Friday of the third week of the quarter.

The following figures are prepared and updated each year by the Office of Student Financial Aid and reflect modest, but adequate, probable costs for students attending the University during the nine-month academic year. They should be used only as a guide in determining the year's expenses.

Room and Board - The Office of Student Financial Aid uses a figure of \$7,017 in determining students' financial need. This figure includes food, utilities, and housing. It is higher than the figure of \$6,663 charged by Housing & Food Services (for double-room occupancy and preferred dining allowance) because it includes the cost of meals not covered in the campus dining plan.

For students living on campus, room and board is paid quarterly. The first payment, approximately \$2,200, is due on September 1 for autumn quarter, except for financial aid recipients, who pay after aid is dispersed.

New Undergraduates - New Student Enrollment and Orientation Fee

As a new undergraduate, you must return the *Enrollment Confirmation Form* and the \$250 nonrefundable New Student Enrollment and Orientation Fee (NSEOF) to confirm your intention to enroll at the University of Washington.

If you have applied for financial aid and you and your family cannot afford the \$250 NSEOF, you may apply for a fee deferral. Write to the Office of Admissions; include your name, Student Number, phone number, and reason for the deferral. Send your letter, along with the *Enrollment Confirmation Form*. Any deferral will be conditional on the verification of your financial aid status.

Returning Undergraduates, Graduates and Professional Students - \$100 Enrollment Confirmation Deposit

Returning undergraduates, new graduate students, and new students in a professional program are required to confirm his or her intention to enroll by paying a nonrefundable \$100 Enrollment Confirmation Deposit (not required of students admitted summer quarter). The \$100 is applied toward tuition and fees assessed for the quarter for which the student is determined to be admissible and subsequently enrolls. A student who pays the fee for a give quarter but does not register in that quarter is not entitled to a refund except by petition in the situation listed below.

2005-2006 Student Budget Nine-Month Living Expenses					
Budget Items	Lives with Parents Undergrad.	Lives with Parents Graduate	Traditional Undergrad.	Non-Traditional Undergrad.	Non-Traditional Graduate
Books	\$ 900	\$ 1,050	\$ 900	\$ 900	\$ 1,050
Room/Board	\$ 2,613	\$ 2,613	\$ 7,164	\$ 10,338	\$ 10,338
Personal	\$ 2,265	\$ 2,265	\$ 2,265	\$ 2,265	\$ 2,265
Transportation	\$ 396	\$ 1,260	\$ 396	\$ 1,260	\$ 1,260
TOTALS	\$6,174	\$7,188	\$10,725	\$14,763	\$14,913

1. A new or returning matriculated student who is unable to obtain courses required for the completion of the degree or certificate program, or courses which are determined by an appropriate academic adviser to be acceptable alternate courses. A written verification from the appropriate academic adviser must be attached to this petition. Such requests for refund must be submitted by Friday of the second week of the quarter. A new or returning matriculated student who, after meeting with an appropriate academic adviser, determines that the program for which admission was granted differs substantially from what the student was led to expect based upon earlier available information. This petition for refund must be submitted before the student registers for courses and in no case later than the first day of the quarter for which admission has been granted. A written verification from the appropriate academic adviser must be included.
2. A new or returning student who applies by the prescribed deadline for financial aid administered by the University's Office of Student Financial Aid, and who cannot be awarded financial aid adequate to his or her needs as determined by that office, and who is therefore unable to attend the University. This petition and a copy of the Notice of Award and Acceptance must be submitted no later than two weeks after receipt of notice of the financial aid award.
3. A new or returning student who is unable to attend the University because of pregnancy, disability, or death, or because of being called involuntarily into the military service of the United States or into civil duty. Documentation is required.

Fee Payment

www.washington.edu/students/sfs/sao/ttnrates.html

An obligation to pay tuition and fees in U.S. dollars is incurred when a student registers. A fee statement is mailed to the student's address on file with the Office of the Registrar.

Payment of this obligation is due by Friday of the third week of the quarter. Nonpayment of tuition and fees by the due date results in a charge of \$120 for late payment. For balances under \$150, the late fee is \$50. There is no late fee for balances under \$50. One-half of tuition is assessed when registration is canceled for nonpayment of tuition and fees. The Summer Quarter Bulletin and *Time Schedule* should be consulted for fees and fee payment schedule applicable to summer quarter only.

When the payment is not in conformance with the tuition and fee billing, specific instructions on how the payment is to be applied must accompany the payment. In the absence of instructions, the University makes a reasoned interpretation of the student's intent and accounts for the funds accordingly. The student number must be specified on all payments.

Fees listed above do not apply to students registered through UW Extension. See the UW Extension Bulletin for their fee structure.

Special Course and Laboratory Fees

The amounts listed above cover normal University charges for course registration. Some courses, however, have extraordinary expenses associated with them, and in such cases the University may charge additional fees in amounts that approximate the added instructional or laboratory costs.

Other Fees

Auditors: There is no reduction in fees for auditors.

Admission Application Fees: Graduate, \$45(online); Medicine, Dentistry, \$35; Law, \$50. Former students returning in the same classification, \$38.

On-Leave Registration Fee: This fee of \$35, charged to graduate students only, provides for a maximum on-leave period of four successive academic quarters or any part thereof and is not refundable.

Late Registration/Reregistration Fees: A late registration service charge of \$25 is assessed when a student registers after the last scheduled day of Period II registration and through the fourteenth day of the quarter. Students registering after the fourteenth day pay a \$75 Late Registration Fee. Waiver or refund of the Late Registration Fee may be petitioned in the Registration Office. Waiver or refund of the \$75 reregistration fee may be petitioned in the Student Fiscal Services Office.

Change of Registration Service Fee: A charge of \$20 is made for any number of add, drop, or change transactions processed during a given day beginning the eighth calendar day of the quarter.

Transcript Fees: A charge of \$4, paid to the Transcript Office in advance, is required for each transcript.

Thesis and Dissertation Fees: Publication binding fee, \$25; dissertation microfilming fee, \$60*; Microfilming for either the entire dissertation, or the abstract only; \$35 Optional copyright fee (*Not available to those microfilming only the abstract.*)

* Part of the obligation of research is publication. In the case of doctoral research, this means microfilm publication of the dissertation and/or abstract. This is a Graduate School requirement in addition to any previous or planned publication of any or all the dissertation. Microfilming allows worldwide distribution of your work. More information about microfilming is provided in the Step 4 section of this manual.

Replacement Fees: Duplicate diploma, \$20; student identification card, \$10.

U-PASS Fee: A U-PASS validation sticker is mailed quarterly with a student's registration confirmation. The U-PASS is valid on all Metro and Community Transit routes at all times and provides parking privileges to carpoolers, riding privileges to vanpool and Night Ride passengers, and merchant discounts. The quarterly fee of \$41 (subject to change) is included on the tuition bill. Students who do not wish to participate in the U-PASS program must return the validation sticker to the University by the tuition payment deadline. The sticker can be returned by mail in the return envelope provided, mailed with the tuition payment, or returned in person to Student Fiscal Services.

All fees are subject to change without notice.

Cancellation of Tuition

Registered students must pay full tuition and fees. Tuition may be canceled or reduced if a student makes an official withdrawal or drops a course during the period specified by state statute. Refunds are given when a cancellation or reduction results in an overpayment.

Continuing Students

1. A student who withdraws on or before the seventh calendar day of the quarter does not pay tuition.
2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition.
3. A student who withdraws after the thirtieth calendar day must pay full tuition.

New and Returning Students

1. A student who withdraws on or before the seventh calendar day forfeits the \$250 New Student Enrollment and Orientation fee or the \$100 Enrollment Confirmation Deposit but does not pay the regular tuition.

2. A student who withdraws after the seventh calendar day through the thirtieth calendar day of the quarter must pay one-half tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.

3. A student who withdraws after the thirtieth calendar day of the quarter must pay full tuition. The \$100 Enrollment Confirmation Deposit is applied toward payment of tuition.

Fee Forfeiture

A student who does not completely withdraw but drops one or more courses may be eligible for lower tuition, depending on the total number of credits remaining after the course drop and on the time period when the drop was made. Tuition for students making a course drop on or before the seventh calendar day of the quarter is determined by the total credits remaining. Tuition for students making a course drop after the seventh calendar day through the thirtieth calendar day of the quarter is computed on the total credits remaining plus one-half the difference between the old tuition and the new tuition. There is no cancellation or reduction in tuition for courses dropped after the thirtieth calendar day of the quarter.

Fee Refund

When a fee payment is made by check, a waiting period is required before a refund can be authorized. An application for refund may be refused, unless it is made during the quarter in which the fees apply. A student who withdraws for disciplinary reasons forfeits all rights to refund or cancellation of any portion of his or her fees.

Financial Obligations

The Comptroller is authorized to place a hold (administrative) on the records of any student who fails to pay amounts due the University.

Until this hold is cleared, the University (1) does not release the student's record or any information based upon the record, (2) does not prepare transcripts or certified statements, and (3) denies registration.

In cases of serious financial delinquency, the Comptroller, with the consent of the Associate Registrar, may order that a student's registration be canceled and that privileges of attendance be withdrawn.

An administrative hold or cancellation also may occur when a student has not complied with other University rules, procedures, or obligations. The hold may be placed on the student's record by the authorized University office responsible for enforcement of the rule, procedure, or obligation involved. The student is not permitted to register for any subsequent quarter or to obtain a transcript of his or her record or a certified statement except on the written release of the office that placed the hold.

Tuition Exemptions and Reductions

www.washington.edu/students/reg/tuition_exempt.html

Faculty/Staff, Washington State Employee, and Washington National Guard Member Tuition Exemption Programs

Eligible faculty, staff, state employees, and Washington National Guard members admitted to the University may request an exemption for a maximum of 6 credits each quarter under these tuition exemption programs. Applicable tuition will be charged for

credits that exceed the 6-credit limit. Because such students are registered on a space-available basis, they must register after other students. The quarterly *Time Schedule* lists registration dates when students enrolling under these exemption programs may register. Eligibility information may be obtained from either the Staff Training and Development Office, or the Registration Office.

"Access" Program for Older Adults

www.washington.edu/students/reg/access.html
The UW allows Washington residents who are 60 years of age or older to audit certain courses on a space-available basis. Students who attend the University under the Access Program are limited to two courses per quarter. There is a nominal registration fee. As auditors, students do not receive credit, participate in discussions, complete laboratory work, or take examinations.

Tuition Reductions

The following categories of students may be eligible for reduced tuition and fees. Students in these categories may contact the offices shown for information or to obtain an application. The reductions are established by legislative mandate and may be revoked by the legislature at any time.

Tuition Exemptions

<u>Category</u>	<u>Contact Office</u>
Faculty/Staff, Washington State Employee and Washington National Guard and Washington National Guard Tuition Exemption Program traindev@u.washington.edu	Staff Training and Development Office (206) 543-1957, or Registration Office (206) 543-4000, regoff@u.washington.edu
Senior citizens under the ACCESS Program resquest@u.washington.edu	Registration Office (206) 543-4000,

Tuition Reductions

<u>Category</u>	<u>Contact Office</u>
Active duty military assigned to Washington and their children and spouses resquest@u.washington.edu	Office of Residency Classification, 264 Schmitz Hall, (206) 543-5932,
Award recipients under the Aid, Washington State Scholars and Washington Award for Vocational Excellence (WAVE) programs	Office of Student Financial Outreach Services, 172 Schmitz, (206) 685-3504
Children of POWs or MIAs specserv@u.washington.edu	Office of Special Services, 520 Schmitz Hall, (206) 543-9122
Children of Washington law enforcement officers or firefighters who died or became totally disabled in the line of duty specserv@u.washington.edu	Office of Special Services, 520 Schmitz Hall, (206) 543-9122

Financial Aid Waivers Aid,	Office of Student Financial 172 Schmitz Hall, 206-685-3504
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Graduate Merit Waivers	The Graduate School, G-1 Communications, 206-543-7152	TAs/RAs with half-time appointments	Graduate School, 201 Gerberding, (206) 543-7152
Immigrants holding a refugee classification who have been in the United States less than one year	Office of Residency Classification, 264 Schmitz Hall, (206) 543-5932, resquest@u.washington.edu	Undergraduate Merit Waivers -- Competitive merit-based scholarships for incoming freshmen	Office of Special Services, 520 Schmitz Hall, (206) 543-9122 specserv@u.washington.edu
Intercollegiate Athletics Gender	Department of Intercollegiate Equity Athletics, Student Athlete Student Services (206) 543-0611	UW Achievement Award -- Competitive merit-based scholarships for incoming freshmen	Office of Special Services, 520 Schmitz Hall, (206) 543-9122 specserv@u.washington.edu
Medical students in the WWAMI Program	School of Medicine, Office of Academic Affairs, A300 Health Sciences, (206) 543-5560	UW faculty members, their children and spouses who are not Washington state residents	Academic Human Resources, 85 Gerberding, (206)-543-5630
Students of foreign nations in exchange programs	International Programs and Exchanges, 453 Schmitz Hall, (206) 543-9272	UW staff members and their children and spouses who are not Washington state residents	Office of Residency Classification, 264 Schmitz Hall, (206) 543-5932, resquest@u.washington.edu
Students participating in the WICHE Program	Student Fiscal Services, 129 Schmitz, (206) 543-4694	Veterans who served in the Persian Gulf combat zone in 1991	Office of Special Services, 520 Schmitz Hall, (206) 543-9122 specserv@u.washington.edu
Students registered in excess of 18 hours if registered in 1st professional programs of medicine, denistry,doctor of pharmacy or law	Budget Office 128a Gerberding Hall, (206) 685-9962	Veterans who served in Southeast Asia during the period of August 5, 1964-May 7, 1975	Office of Special Services, 520 Schmitz Hall, (206) 543-9122 specserv@u.washington.edu

UNDERGRADUATE STUDY

Office of Undergraduate Education

www.washington.edu/oue/

The University of Washington established the Office of Undergraduate Education (OUE) in 1992 in order to make undergraduate education a more visible and central part of the University's work and purpose. OUE offers opportunities and resources for students and their families, faculty members, and academic departments and programs. OUE's unique mission of ensuring excellence in undergraduate teaching and learning is critical to the University's commitment to providing students a rich academic experience.

Intercollege Programs

The following programs, described in detail in other sections of the catalog, are administered by the Office of Undergraduate Education.

General Studies

www.washington.edu/students/genecat/academic/gen_studies.html

General Studies provides students an opportunity to obtain an individually designed interdisciplinary degree through the College of Arts and Sciences. Students may also pursue a major in one of several existing interdisciplinary programs. Requirements for the Bachelor of Arts or Bachelor of Science degree are shown in the Arts and Sciences section of this catalog.

Center for Quantitative Science

depts.washington.edu/cqs/

The Center for Quantitative Science in Forestry, Fisheries, and Wildlife is an intercollege academic unit sponsored by the Office of Undergraduate Education, the College of Ocean and Fishery Sciences, and the College of Forest Resources. The Center offers courses in mathematics and statistical methods as applied to problems in biology, ecology, the environment, and renewable-resource management for undergraduate students. The faculty of the Center includes members of the College of Forest Resources and the School of Aquatic and Fishery Sciences, as well as other units. The quantitative science minor is designed to give undergraduates majoring in biology, ecology, the environment, and renewable-resource management programs a thorough grounding in relevant statistical and mathematical modeling methodology.

Program on Africa

depts.washington.edu/poa/

The Program on Africa (PoA) develops, co-ordinates, and disseminates information about inter-disciplinary, cross-college, Africa-related courses and activities at the UW. It aims to foster an interest in the African continent and its Diaspora, with the ultimate goal of involving knowledgeable, well-trained, and committed students and graduates in Africa's political, cultural, medical, technological, and economic future. PoA offers undergraduate students a minor in African Studies with courses drawn from disciplines as varied as fisheries, anthropology, social work, history, public health, art, and music.

Program on the Environment

depts.washington.edu/poeweb/

The Program on the Environment (PoE) fosters and promotes interdisciplinary environmental education at the UW by linking scholars active in environmental fields from across the University

to build a trans-disciplinary network of educators, students, and researchers. PoE offers an undergraduate degree in Environmental Studies, a minor in Environmental Studies, and three graduate certificate programs. The program provides students knowledge in four domains of inquiry: natural sciences; social sciences; law, policy, and management; and ethics, values, and culture. PoE merges these fields through rigorous coursework and hands-on learning to provide a unique opportunity for students and faculty to explore complex environmental issues from multiple perspectives.

Undergraduate Majors

www.washington.edu/students/ugrad/advising/majmenu.html

To graduate from the UW, students must complete one of the majors listed below. In many cases, the student need not make a final choice until the beginning of the junior year, although programs with considerable mathematics and science (e.g., engineering and premedicine) include lock-step requirements that must be started early on if the student expects to finish in four years.

Students can enter some majors directly (e.g., those in Ocean and Fishery Sciences, most in Forest Resources, and some in Arts and Sciences), but most students start out as premajors. As premajors, they take courses to fulfill general requirements and admission requirements for the major. Many majors require one or two years of pre-admission course work, although a few require more. Admission to many majors is competitive, which means students may not be accepted even if they complete all the prerequisite course work, depending on their grades and other factors.

The *General Catalog* shows requirements for all majors, but students should see an adviser to ask about changes, course sequences, or new options.

Satisfactory Progress

www.washington.edu/students/reg/satprog.html

Students admitted to the University to pursue baccalaureate degrees are expected to make satisfactory progress toward the attainment of the degree and are expected to enter a major and to graduate after completion of a reasonable number of credits.

By the time undergraduate students have completed 105 credits, they must either be accepted in their major or have their premajor status extended temporarily by an adviser. Extensions are normally granted only to students who are in the final phases of completing admission requirements for a major to which they have a reasonable chance of acceptance.

Students who do not either declare a major or have their premajor status extended by the time they have earned 105 credits will have a "hold" placed against registration for the following quarter.

Students must normally graduate with their first baccalaureate degree by the time they have completed 30 credits beyond the credits required for the first degree or concurrent degrees. Departmental advisers may grant extensions beyond the 30-credit limit.

Postbaccalaureate students are expected to be either preparing for admission into a degree program, seeking an additional baccalaureate degree. Students admitted as "postbaccalaureate undeclared" must declare a major by the time they have earned 30 credits beyond their last degree, and once a degree objective has been declared, must make progress toward that degree as evidenced by the courses they have completed satisfactorily. Advisers may grant extensions beyond the 30-credit limit.

The Faculty Council on Academic Standards may terminate a student's enrollment if the student demonstrates lack of academic progress as evidenced by excessive course repeats, course drops, or University withdrawals and cancellations. The student may be reinstated with the approval of the student's college and the council. EOP students may be reinstated in consultation with the Office of Minority Affairs.

Undergraduate Minors

Undergraduate students have the option of completing a minor. Minors require the completion of at least 25 credits, 15 of which must be taken in residence at the UW. There are no departmental admission requirements for minors. Students may declare an approved minor when they have earned 90 credits or more. A cumulative GPA of 2.00 is required for courses within the minor. Some departments do not offer minors. Requirements for minors established as of spring 2002 are shown in the academic programs section of this catalog. A list of currently offered minors is available at the Undergraduate Gateway Center, 171 Mary Gates Hall.

Undergraduate Degrees

The UW grants the following degrees upon satisfactory completion of appropriate programs of study in the departments, schools, and colleges:

Bachelor of Arts	B.A.
Bachelor of Arts in Business Administration	B.A.B.A.
Bachelor of Clinical Health Services	B.C.H.S.
Bachelor of Fine Arts	B.F.A.
Bachelor of Landscape Architecture	B.L.Arch.
Bachelor of Music	B.Mus.
Bachelor of Science	B.S.
Bachelor of Science in Aeronautical and Astronautical Engineering	B.S.A&A.
Bachelor of Science in Aquatic and Fishery Sciences	B.S.AFS.
Bachelor of Science in Bioengineering	B.S.Bio.E.
Bachelor of Science in Chemical Engineering	B.S.Ch.E.
Bachelor of Science in Civil Engineering	B.S.C.E.
Bachelor of Science in Computer Engineering	B.S.Comp.E.
Bachelor of Science in Construction Management	B.S.C.M.
Bachelor of Science in Electrical Engineering	B.S.E.E.
Bachelor of Science in Engineering	B.S.E.
Bachelor of Science in Forest Resources	B.S.F.
Bachelor of Science in Health Information Administration	B.S.H.I.A.
Bachelor of Science in Industrial Engineering	B.S.I.E.
Bachelor of Science in Informatics	B.S.Info.
Bachelor of Science in Materials Science and Engineering B.S.M.S.E.	
Bachelor of Science in Mechanical Engineering	B.S.M.E.
Bachelor of Science in Medical Technology	B.S.Med.Tech.
Bachelor of Science in Nursing	B.S.Nurs.
Bachelor of Science in Technical Communication	B.S.T.C.

THE GRADUATE SCHOOL: GRADUATE STUDY

www.grad.washington.edu

The University of Washington awarded its first graduate degree, a Master of Arts in classical languages, in 1885 and its first Doctor of Philosophy degree, in chemistry, in 1914. Since those beginnings, the University has conferred more than 65,000 master's degrees and 14,000 doctoral degrees, exclusive of medical, dental, and first legal doctorates.

Through its graduate programs, the University fulfills several functions vital to a healthy society: the advancement of human knowledge is facilitated through the development and conduct of scientific research; the education of scholars, teachers and a multitude of professionals in areas that cut across the academic spectrum insure that knowledge and information are communicated to the general public for the use and benefit of all. These functions ensure that some of the problems and needs confronting society are resolved.

To manage its developing graduate programs, the Graduate School was created as a temporary entity in 1899 and was permanently established in 1910. The purpose of the Graduate School is to define and support excellence in graduate education and the research and scholarly activities associated with it. Graduate study is guided by the Dean of the Graduate School and an ever-changing graduate faculty of more than 3,000 members who are selected for their interest in and concern for graduate education at the University of Washington. There are now more than 8,000 graduate students working toward master's or doctoral degrees in 100 separate University programs. A growing number of interdisciplinary graduate degree and graduate certificate programs that have been established through the efforts of interested faculty members.

Graduate School policy is enacted through an elected council of ten graduate-faculty members who are chosen from among the graduate-faculty population and who advise the Dean on matters of policy and procedure. Complementary to that input, each degree-offering unit within the University appoints a graduate program coordinator who serves as an important link between the unit and the Graduate School, advising students on questions concerning Graduate School and departmental degree requirements.

The Graduate School also has a number of responsibilities that relate to its primary ones, such as graduate program review, Graduate Opportunities and Minority Achievement Program, the administration of the Graduate School Fund and certain fellowship programs, as well as such central facilities as the University of Washington Press, and the Walker-Ames and the Jessie and John Danz distinguished visiting professorships.

As part of its commitment to excellence, the University is committed to providing opportunities for students to learn and grow through experiences rich in cultural, ethnic, and racial diversity. Within the Graduate School, the Graduate Opportunities and Minority Achievement Program (GO-MAP) works with the University to provide an innovative and inclusive graduate student community and experience. GO-MAP takes a leadership role in the recruitment and retention of ethnic and racial minority and underrepresented students, building community on and off campus, improving campus climate, and enhancing scholarship and research.

In addition, GO-MAP administers several scholarships and assistantships aimed at increasing diversity in the University's graduate programs.

Graduate Degree Programs

The Office of Academic Programs in the Graduate School contributes to the University's educational and research mission by conducting quality assessment of proposed and continuing education programs at the graduate and undergraduate level as well as research institutes and centers. Through program review, it ensures academic program quality, including all aspects of an academic unit, and promotes communication among academic units throughout the three-campus system. The principle mechanism by which this is achieved is through a process of peer review. Reviews of degree programs are conducted on a ten-year cycle, or at predetermined shorter intervals. For further information, see Graduate School Memorandum No. 7: Periodic Review of Existing Degree Programs at www.grad.washington.edu and the schedule of program reviews at www.grad.washington.edu/Acad/Academicprograms.htm, or contact the Office of Academic Programs in the Graduate School at 206-685-3519.

College of Architecture and Urban Planning

Architecture & Urban Planning	M.S.P.C.I., M.U.P.
Architecture	M.Arch., M.S.
Built Environment	Ph.D.
Construction Management	M.S.C.M.
Landscape Architecture	M.L.A.

College of Arts and Sciences

Anthropology	M.A., Ph.D.
Art	M.F.A.
Art History	M.A., Ph.D.
Asian Languages & Literature	M.A., Ph.D.
Astronomy	M.S., Ph.D.
Atmospheric Sciences	M.S., Ph.D.
Biology	M.S., Ph.D.
Chemistry	M.S., Ph.D.
Classics	M.A., Ph.D.
Communication	M.A., M.C., Ph.D.
Comparative Literature	M.A., Ph.D.
Center for Digital Arts and Experimental Media	Ph.D.
Dance	M.F.A.
Drama	M.F.A., Ph.D.
Economics	M.A., Ph.D.
English	M.A., M.F.A., M.A.T., Ph.D.
Earth and Space Sciences	M.S., Ph.D.
French and Italian Studies	M.A., Ph.D.
Geography	M.A., Ph.D.
Germanics	M.A., Ph.D.
History	M.A., Ph.D.
Jackson School International Studies ...	M.A.I.S. (includes China Studies; the Comparative Religion; International Studies; Japan Studies; Korea Studies; Middle Eastern Studies; Russia, East European & Central Asian Studies; and South Asian Studies)
Linguistics	M.A., Ph.D.
Mathematics	M.S., M.A., Ph.D.
Applied Mathematics	M.S., Ph.D.
Music	M.A., M.M., D.M.A., Ph.D.
Near Eastern Languages & Civilization	M.A.
Philosophy	M.A., Ph.D.
Physics	M.S., Ph.D.
Political Science	M.A., Ph.D.
Psychology	M.S., Ph.D.
Scandinavian Studies	M.A., Ph.D.
Slavic Languages & Literatures	M.A., Ph.D.
Sociology	M.A., Ph.D.
Spanish and Portuguese Studies	M.A., Ph.D.
Speech Communication	M.A., Ph.D.

Speech & Hearing Sciences M.S., Ph.D., Au.D.
 Statistics M.S., Ph.D.
 Women Studies M.A., Ph.D.

Graduate School of Business Administration

Accounting M.P.Acc.
 Business Administration M.S.I.S., M.B.A., Ph.D.

School of Dentistry

Endodontics M.S.D.
 Oral Biology M.S., Ph.D.
 Oral Medicine M.S.D.
 Orthodontics M.S.D.
 Pediatric Dentistry M.S.D.
 Periodontics M.S.D.
 Prosthodontics M.S.D.

College of Education M.Ed., M.I.T., Ed.D.,
 Ph.D.

College of Engineering

Aeronautics & Astronautics M.S.A.A., M.A.E.,
 Ph.D.
 Chemical Engineering M.S.E., M.S.Ch.E.,
 Ph.D.
 Civil and Environmental Engineering M.S., M.S.E.,
 M.S.Civ.E., Ph.D.
 Computer Science & Engineering M.S., Ph.D.
 Electrical Engineering M.S.E., M.S.E.E.,
 Ph.D.
 Engineering M.S.E., M.S.
 Industrial Engineering M.S.I.E., Ph.D.
 Mechanical Engineering M.S.M.E., M.S.E.,
 Ph.D.
 Materials Science & Engineering M.S.M.S.E., M.S.,
 Ph.D.
 Technical Communication M.S.T.C., M.S., Ph.D.

College of Engineering and School of Medicine

Bioengineering M.Med.E., M.S.Bio.E.,
 M.S.E., Ph.D.

College of Forest Resources M.S., M.F.R., M.Env.H.,
 Ph.D.

The Information School M.S.I.M., M.L.I.S.,
 Ph.D.

Interdisciplinary Degree Programs

Biology Teaching Group M.S.
 Health Administration M.H.A.
 Individual PhD Program Ph.D.
 Molecular & Cellular Biology M.S., Ph.D.
 Museology M.A.
 Near & Middle Eastern Studies Ph.D.
 Neurobiology & Behavior M.S., Ph.D.
 Nutritional Science M.S., Ph.D.
 Public Health Genetics Group M.S., Ph.D.
 Quantitative Ecology & Resource
 Management M.S., Ph.D.
 Urban Design & Planning Ph.D.

School of Law L.L.M., Ph.D.

School of Medicine

Biochemistry M.S., Ph.D.
 Biological Structure M.S., Ph.D.
 Comparative Medicine M.S.
 Genome Sciences M.S., Ph.D.
 Immunology M.S., Ph.D.
 Laboratory Medicine M.S.

Medical Education and Biomedical
 Informatics M.S., Ph.D.
 Medical History & Ethics M.A.
 Microbiology (Medicine) M.S., Ph.D.
 Pathology M.S., Ph.D.
 Pharmacology M.S., Ph.D.
 Physiology & Biophysics M.S., Ph.D.
 Rehabilitation Medicine M.O.T., M.P.T., M.R.M.,
 M.S., D.P.T.

School of Nursing M.N., M.S., Ph.D.

College of Ocean and Fishery Sciences

Aquatic & Fishery Sciences M.S., Ph.D.
 Marine Affairs M.M.A.
 Oceanography M.S., Ph.D.

School of Pharmacy

Medicinal Chemistry M.S., Ph.D.
 Pharmaceutics M.S., Ph.D.
 Pharmacy M.S., Ph.D.

Evans School of Public Affairs M.P.A.

School of Public Health and Community Medicine

Biostatistics M.S., M.P.H., Ph.D.
 Environmental & Occupational Health
 Science M.S., M.P.H., Ph.D.
 Epidemiology M.S., M.P.H., Ph.D.
 Health Services M.S., M.P.H., Ph.D.
 Pathobiology M.S., Ph.D.

School of Social Work M.S.W., Ph.D.

Because the following professional doctoral degrees offered by
 the
 University are not considered to be graduate degrees, they are
 not
 administered through the Graduate School.

Dentistry D.D.S.
 School of Law J.D.
 School of Medicine M.D.
 School of Pharmacy Pharm.D.

Graduate Admissions

Additional program information is available on the World Wide
 Web at www.grad.washington.edu.

The University of Washington reaffirms its policy of equal
 opportunity regardless of race, color, creed, religion, national
 origin, sex, sexual orientation, age, marital status, disability, or
 status as a disabled veteran or Vietnam-era veteran in accor-
 dance with University policy and applicable federal and state
 statutes and regulations.

Application to the UW through the Office of Graduate Admissions
 is available for three types of students. It is important to under-
 stand the distinctions between the categories.

A **graduate student** is a person working toward a master's or
 doctoral degree or earning a school administrator's credential.
 Students must be admitted to this status in order to earn a
 degree. Information about the Application for Admission to the
 Graduate School is obtained from the program to which you wish
 to apply.

A **visiting graduate student** is a person who plans to transfer
 a limited number of graduate credits earned at the UW to another
 institution where he or she is actively pursuing a graduate
 degree. Admission is based in part on availability of resources.

Visiting graduate applicants must have been admitted to another recognized graduate school, be currently pursuing a graduate degree there, and be in good standing. A Certificate of Status signed by the home institution is required. The Application and Certificate are available online at <https://www.grad.washington.edu/application/>. Individual departments may require additional materials, such as transcripts, GRE/GMAT scores, a statement of purpose, or a list of desired course work.

Some graduate programs have chosen to offer admission to **graduate nonmatriculated students**. These students are not presently seeking a graduate degree but may apply a maximum of 12 credits earned in this category to degree requirements should they later be accepted into a graduate program. Applicants should meet minimum Graduate School admission requirements but *admission as a graduate nonmatriculated student does not imply admission to a graduate degree program*. The Application to Graduate Nonmatriculated Status must be obtained from the program to which you wish to apply. Official sealed transcripts from all collegiate institutions previously attended must be sent to the Graduate Nonmatriculated Office, Box 84808, University of Washington, Seattle, WA 98124-6108. (Refer to Graduate School Memorandum No. 37 for further information.)

Admission to the UW is necessarily a selective process. The prospective student must hold a baccalaureate degree from an accredited college or university in this country or an equivalent degree from a foreign institution. The student's record should be a strong one with an average grade of "B" or a 3.00 grade-point, or better. The primary criterion and the priority for admission of new applicants into a graduate program is the applicant's ability, as decided by the appropriate faculty, to complete the graduate program expeditiously with a high level of achievement. One aspect of meeting this criterion is the matching of interests between applicants and faculty. Additional factors may be used in developing a pool of qualified applicants for admission to the Graduate School. Weights given these and other factors vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:

1. Priority for admission of applicants into a graduate degree program based upon the applicant's apparent ability, as determined by the University, to complete the program with a high level of achievement.
2. No practice may discriminate against an individual because of race, color, creed, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam era veteran.
3. Sustained efforts shall be made to recruit qualified applicants who are members of groups that are underrepresented in certain disciplines.
4. All applicants to a degree-offering unit shall be processed through the same set of procedures to assure that all applicants are evaluated on their individual merits.
5. Tests and criteria for admission should relate to the actual requirements of the graduate program. Reasonable accommodation for testing conditions may be made to compensate for relevant disabilities.
6. Additional factors may be used in developing a pool of qualified applicants for admission to the Graduate School. Weights given these and other factors may vary among graduate degree programs. No factor will confer admission on an academically unqualified applicant. These factors include, but are not limited to, the following:

- a. Grades earned, especially for subjects in or closely related to the field of the applicant's proposed graduate work.
- b. Scores on the Graduate Record Examination (GRE) Verbal, Quantitative, and Analytical Tests, on the GRE Advanced Test, on other tests related to the applicant's field, and on other aptitude tests which may be required.
- c. Personal interviews of the applicant by the department admissions committee.
- d. The career objectives of the applicant and the extent to which the graduate degree program may be expected to prepare the applicant for those objectives.
- e. Written and oral recommendations from persons who are qualified to evaluate the applicant's academic record and promise.
- f. The applicant's degree objective (i.e., master's degree, doctoral degree, or a master's followed by a doctoral degree).
- g. Activities or accomplishments; educational goals; prior employment experience; living experiences, such as growing up in a disadvantaged or unusual environment; special talents.
- h. Academic accomplishments in light of the applicant's life experiences and special circumstances.. These experiences and circumstances may include, but are not limited to disabilities, low family income, first generation to attend college, need to work during college, disadvantaged social or educational environment, difficult personal and family situation or circumstances, and refugee status or veteran status.

Importance given to these factors will vary among degree programs.

Most Graduate School admissions are for summer or autumn quarters. Admissions for winter and spring quarters may be severely restricted due to considerations of space.

Each academic program at the UW has a graduate program coordinator who is responsible for providing advice, guidance, and assistance to applicants as well as to students working toward graduate degrees. Prospective graduate students are urged to contact the graduate program coordinator in their program of interest for information about any aspect of graduate study, including research, curriculum, faculty, and financial support in the form of teaching and research assistantships, grants, and scholarships. Information about graduate programs is available at www.grad.washington.edu.

Admission Process

Information about the application process for both graduate and graduate nonmatriculated status must be obtained directly from the department. Visiting graduate applicants should go to <https://www.grad.washington.edu/application/> for application information. *It is very important to submit all application documents in time to meet departmental deadlines as these will supersede graduate admissions deadlines.*

Registration

After successful applicants have been offered admission, the Registration Office sends a request for a \$100 Enrollment Confirmation Deposit to indicate the intent to register. This nonrefundable deposit will apply toward the first quarter's tuition.

Once admitted, graduate students are expected to maintain registered or on-leave status until the degree is conferred. (See section on Continuous Enrollment.)

Financial Aid for Graduate Students

Students applying for fellowships, traineeships, and assistantships or associateships must make certain that complete transcripts and other credentials are on file by February 15 (earlier submission of applications and supporting documents is urged by all departments and required by some). Awards and appointments are usually made about April 1. Application forms may be obtained by writing to the graduate program coordinator of the appropriate department.

Fellowships, Traineeships, and Scholarships

A limited number of fellowships, traineeships, and scholarships is available through individual departments to outstanding students in fields of study leading to advanced degrees. Application forms may be obtained from the graduate program coordinators in the departments.

The Graduate School and the University of Washington Libraries have collaborated to provide the Grants and Funding Information Services (GFIS) for University of Washington graduate students (and faculty) who are seeking any type of general research funding for use at the University of Washington. GFIS promotes awareness of external funding information resources by providing drop-in educational consultations, maintaining a print collection for grant seekers, and offering quarterly seminars highlighting Web-based grant-seeking tools. GFIS works with students and faculty to devise a search strategy, helping to focus efforts and locate available resources. GFIS also will demonstrate searching on several online databases and how to use its print collection of funding resource books so that students can perform future searches based on changing funding needs. GFIS also maintains resources to assist in the proposal-writing process, including grant-writing handbooks and links to online resources.

To set up a consultation, email gfis@u.washington.edu, call 206-616-3084, or submit a research profile using GFIS's online form. For funding seminar schedules, check the Web at www.lib.washington.edu/gfis/events.html.

Work Study Graduate Assistantships

Graduate students who are eligible for the need-based college work-study program may qualify for work study graduate assistantships in teaching or research. Students must submit financial aid applications to the Office of Student Financial Aid by the February 28 deadline to be considered for these positions. Information is available from the Office of Student Financial Aid.

Employment Opportunities

The campus offers other job opportunities for graduate students. Students may apply directly to the chair of the department in which they hope to work or to the Student Employment Office. Students seeking part-time employment must be enrolled and on campus before they may obtain jobs.

Advisory positions in University residence halls paying room and board are available for single graduate students, both men and women. Additional information may be obtained from the Director of Residence Halls Programs, 301 Schmitz.

Spouses of students also may apply for regular full- and part-time University employment. These positions cover a wide range of occupations and offer pay comparable to the prevailing salaries in the community. Some carry such fringe benefits as vacations, sick leave, and opportunities to enroll in University courses. Inquiries may be directed to the Staff Employment Office, 1320 Northeast Campus Parkway.

Loans

Long-term educational loans are available to graduate students through the Federal Perkins Student Loan, the Federal Direct Stafford Loan, and the Federal Direct Unsubsidized Stafford Loan programs. An application form for these programs (the Free Application for Federal Student Aid, or FAFSA) is available in the office of Student Financial Aid, Box 355880, 105 Schmitz Hall, 206-685-9395, or from the U.S. Department of Education Web site at www.ed.gov/offices/OPE/express.html. The Office of Student Financial Aid may also be reached by email (osfa@u.washington.edu) or on the Web at www.washington.edu/students/osfa/. The application deadline is February 28 for the following autumn quarter.

Students should meet the application deadline even if they have not yet been admitted to the Graduate School.

The Federal Perkins Student Loan and the subsidized Federal Direct Stafford Loan are awarded to students who demonstrate financial need. Students who do not qualify for need-based assistance may qualify for Federal Direct Unsubsidized Stafford Loans. For more detailed information on these loan programs, visit the Office of Student Financial Aid Web site at www.washington.edu/students/osfa/.

Short-term emergency loan funds also are available through the Office of Student Financial Aid. Several different types of short-term loans are possible. More information is available from the Office of Student Financial Aid, Short-Term Loans, 172 Schmitz, 206-685-1282. The Graduate School also has a short-term emergency loan available. For more information, call 206-543-5900.

Graduate Opportunities and Minority Achievement Program

The Graduate Opportunities and Minority Achievement Program (GOMAP) works to develop and maintain a diverse and welcoming climate from which all students may benefit. As part of its duties, GOMAP oversees the Graduate School Fund for Excellence and Innovation (see Special Programs and Facilities) and assists University of Washington graduate programs in developing and maintaining efforts designed to increase the enrollment of students from ethnic minority groups that have been historically underrepresented in graduate programs.

Recognizing that financial aid in the form of scholarships, grants, and fellowships is important in achieving and maintaining diversity, the GOMAP administers a variety of need- and merit-based fellowships. Merit-based awards are generally made through the nomination and support of the department in which the student is enrolled. Need-based awards are based upon an evaluation of the student's need as established by the Free Application for Federal Student Aid (FAFSA) and the Office of Student Financial Aid. Students who have varied cultural experiences or educationally or economically disadvantaged backgrounds and who will therefore contribute to the intellectual and social enrichment of the University, are encouraged to apply. Students must be U.S. citizens or permanent residents to be eligible.

Financial assistance from individual departments may also be available. Students should apply directly to the chair of their department. Students are also encouraged to make use of the University's Grants and Funding Information Service located in Suzzallo Library.

Further information on fellowships administered by GOMAP may be obtained by writing to the University of Washington, Graduate School, Graduate Opportunities and Minority Achievement Program, Box 351240, Seattle WA 98195-1240, or emailing

All awards are contingent upon the student's admission to the UW Graduate School.

Graduate Degree Policies

Usually focused on a specific field of knowledge, graduate study is conducted through a variety of means, including lectures, seminars, independent advanced study, special reading courses, internships, and participation in research. Graduate programs leading to the Master of Arts, Master of Science, or Doctor of Philosophy degrees emphasize the development of the student's ability for independent scholarly work and the creation of new knowledge through research. Practice-oriented programs, which ordinarily lead to the degree of master or doctor in a particular professional field, emphasize preparation of the student for professional practice at the frontiers of existing knowledge.

Many master's and all doctoral programs culminate in the presentation of a thesis or dissertation conveying the results of the independent study and research carried out by the student. A master's thesis contributes to knowledge, reviews or critiques the state of knowledge in a field, creates a new design or composition, or represents some other appropriate kind of independent contribution. A doctoral dissertation must set forth a significant contribution to knowledge or understanding in the student's field, be presented in scholarly form, and demonstrate that the student is competent to engage independently in the pursuit of solutions to important problems. The student must defend the doctoral dissertation in a Final Examination conducted by a faculty committee and open to all other graduate-faculty members. A member of the graduate faculty from some other discipline participates as an official representative of the Graduate School, including various major evaluations such as the General Examination and Final Examination.

Graduate Program Coordinator

The graduate student's initial work at the University is guided by the graduate program coordinator in his or her field. The coordinator must be a senior tenured member of the graduate faculty and is the official representative of the academic unit that offers the graduate degree program. The graduate program coordinator maintains familiarity with policies and procedures of the Graduate School and provides overall coordination of graduate activities within the unit.

Graduate Courses

Graduate courses are intended for, and ordinarily restricted to, either students enrolled in the Graduate School or graduate nonmatriculated students, and are given numbers from 500 through 800. Some courses at the 300 and 400 levels are open both to graduates and to upper-division undergraduates. Such courses, when acceptable to the supervisory committee, may be part of the graduate program. The Graduate School accepts credit in approved 300-level courses for the minor or supporting fields only. Courses at the 300 level are not included in the calculation of grade-point average (GPA) and will not apply toward the minimum Graduate School requirement of 18 graded credits for the master's or doctoral degree. Approved 400-level courses are accepted as part of the major as well as minor or supporting fields. Courses numbered 498 and entitled Special Topics or Special Projects normally are not applicable to a graduate degree program if addressed primarily to introductory content and undergraduate students. Undergraduate research (499) is not accepted as part of the graduate program. Graduate School Memorandum No. 36 offers additional information on graduate courses. With the exception of summer quarter, students are limited to a maximum of 10 credits per quarter of any combination of courses numbered 600, 700, or 800.

Repeating Courses

Graduate students may repeat any course. Both the first and second grades will be included in the cumulative GPA. Subsequent grades will not be included, but will appear on the permanent record. The number of credits earned in the course will apply toward degree requirements only once.

Grading System for Graduate Students

In reporting grades for graduate students, units that offer graduate degrees use the system described herein. Grades are entered as numbers, the possible values beginning at 4.0 and decreasing by one-tenth increments until 1.7 is reached. Grades below 1.7 are recorded as 0.0 by the Registrar. A minimum grade of 2.7 is required in each course that is counted toward a graduate degree. A minimum GPA of 3.00 is required for graduation.

Correspondence between number grades and letter grades is as follows:

Numeric grade-point equivalent	Letter grade	Numeric grade-point equivalent	Letter grade
4.0	A	2.8	B-
3.9		2.7	
3.8	A-	2.6	
3.7		2.5	
3.6		2.4	C+
3.5		2.3	
3.4	B+	2.2	
3.3		2.1	
3.2		2.0	C
3.1		1.9	
3.0	B	1.8	
2.9		1.7	
		1.6-0.0	E

The following letter grades also may be used:

I Incomplete. An incomplete may be given only when the student has been in attendance and has done satisfactory work to within two weeks of the end of the quarter and has furnished proof satisfactory to the instructor that the work cannot be completed because of illness or other circumstances beyond the student's control.

To obtain credit for the course, a student must successfully complete the work and the instructor must submit a grade. In no case may an incomplete be converted into a passing grade after a lapse of two years or more. An incomplete received by a graduate student does not automatically convert to a grade of 0.0 but will remain a permanent part of the student's record.

N No grade. Used only for hyphenated courses and courses numbered 600 (Independent Study or Research), 601 (Internship), 700 (Master's Thesis), 750 (Internship), or 800 (Doctoral Dissertation). An *N* grade indicates that satisfactory progress is being made, but evaluation depends on completion of the research, thesis, internship, or dissertation, at which time the instructor or supervisory committee chair should change the *N* grade(s) to one reflecting the final evaluation.

S/NS Satisfactory/not satisfactory. A graduate student, with the approval of the graduate program coordinator or supervisory committee chair, may elect to be graded *S/NS* in any numerically graded course for which he or she is eligible. If a student does not so elect, then the student is graded on a numerical basis. If approval is granted, the student must elect the *S/NS* option either when registering or no later than the end of the seventh week of the quarter.

CR/NC Credit/no credit. With the approval of the faculty in the academic unit, any course may be designated for grading on the credit/no-credit basis by notice in the appropriate *Time Schedule*. For such courses, the instructor submits a grade of *CR* or *NC* to be recorded by the Registrar's Office for each student in the course at the end of the quarter. All courses numbered 600, 601, 700, 750, and 800 may be graded with a decimal grade, *CR/NC*, or *N* at the instructor's option.

W Course Withdrawal.

HW Hardship Withdrawal. Refer to the University of Washington *Time Schedule* for procedures and dates, or visit the Web at www.washington.edu/students/reg/wdoffleave.html#Q3.

Of the minimum number of credits required for a graduate degree, a graduate student must show numerical grades in at least 18 quarter hours of course work taken at the UW. These numerical grades may be earned in approved 400-level courses and 500-level courses.

The student may petition the Dean of the Graduate School to modify the procedures described above. The petition should be accompanied by comments and recommendations from the graduate program coordinator.

Scholarship

A cumulative GPA of 3.00 or above is required to receive a degree from the Graduate School. A graduate student's GPA is calculated entirely on the basis of numeric grades in 400- and 500-level courses. The grades of *S*, *NS*, *CR*, *NC*, and *N* are excluded, as are all grades in courses numbered 600, 601, 700, 750, and 800, and in courses at the 100, 200, and 300 levels.

Failure to maintain a 3.00 GPA, either cumulative or for a given quarter, constitutes low scholarship and may lead to a change-in-status action by the Graduate School. Failure to maintain satisfactory performance and progress toward a degree may also result in a change-in-status action by the Graduate School.

(See Graduate School Memorandum No. 16 for additional information.)

Withdrawal Policy

Refer to the University of Washington *Time Schedule* for procedures and dates, or look on the Web at www.washington.edu/students/reg/wdoffleave.html

Language Competency Requirements and Examinations

Competence in one or more languages in addition to English is desirable for all fields of advanced study and is often required, especially in the scholarly and research-oriented programs leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy.

Requirements for foreign-language competence are established by the graduate faculty in the unit offering the graduate program. Language competence in certain languages other than English (i.e., languages that may have special significance to the field) may be specified as helpful or desirable or may be required. Students should consult the graduate program coordinator for information and advice about desirable or required competence in foreign languages.

When appropriate, students are urged to establish foreign-language competence as undergraduates before entering the Graduate School or as early as possible in their graduate careers. The University's language-competence requirements in French, German, and Spanish may be satisfied by successful

completion of the standardized examinations given by the Educational Assessment Office. Other foreign language examinations are also given at the UW.

It is assumed that citizens of certain English-speaking countries who are admitted to the Graduate School are competent in the English language; citizens of non-English-speaking countries must demonstrate a satisfactory command of English, both for admission and for appointment as teaching assistants.

Refer to Graduate School Memorandum No. 8, *English Language Competence for Admission to the Graduate School* (www.grad.washington.edu/Acad/gsmemos/gsmemo08.htm) for more information.

Enrollment Requirement

The enrollment requirement for the master's degree is 30 credits at the University of Washington

For the doctoral degree, the enrollment requirement is 90 credits, 60 of which must be taken at the University of Washington. With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment. Doctoral study requires an immersion in an academic field and its intellectual community. Degree-granting units may require a period of full-time or on-site study.

Only courses at the 400-, 500-, 600-, 700-, and 800-levels can be applied to enrollment or course credit in the major field for advanced degrees (please see Graduate Courses earlier in this section regarding courses numbered 498 and 499). Courses at the 300-level are not applicable to enrollment or course credit toward advanced degrees except when applied by permission of the graduate program coordinator or supervisory committee toward the graduate minor or supporting courses. Courses numbered below 300 are not applicable to enrollment or course credit for advanced degrees.

Final Quarter Registration

A student must maintain registration as a full- or part-time graduate student at the University for the quarter the master's degree, the Candidate certificate, or the doctoral degree is conferred.

A student who does not complete all degree requirements by the last day of exam week must be registered for the following quarter.

Continuous Enrollment and Official On-Leave Requirement

Policy

To maintain graduate status, a student must be enrolled on a full-time, part-time, or On-Leave basis from the time of first enrollment in the Graduate School until completion of all requirements for the graduate degree. The student must be registered when applying for the master's degree, the passing of the master's final examination, or doctoral General or Final Examinations, the filing of the thesis or dissertation, and the receiving of the degree. Summer quarter On-Leave enrollment is automatic for all graduate students who were either registered or on-leave the prior spring quarter. Failure to maintain continuous enrollment constitutes evidence that the student has resigned from the Graduate School.

A student's petition for On-Leave status must be approved by the departmental graduate program coordinator or alternate and submitted to the Registration Office no later than the fifth day of

the quarter. To be eligible for On-Leave status, the student must have registered for, and completed, at least one quarter at the UW and have been registered and completed the previous quarter, or have been officially On-Leave (except summer quarter). An On-Leave student is entitled to use the University Libraries and to sit for foreign-language competence examinations, but is not entitled to any of the other University privileges of a regularly enrolled and registered full- or part-time student. The student pays a nonrefundable fee to obtain On-Leave student status covering four successive academic quarters or any part thereof. An On-Leave student returning to the University on or before the termination of the period of the leave must file a Returning Student Reenrollment Application (available at 225 Schmitz) by the deadline stated on the form and register in the usual way as a full- or part-time student (see Graduate School Memorandum No. 9 for procedures). A student who returns before the termination of the On-Leave period and maintains registration for any part of a quarter cancels On-Leave status. Please note: Periods spent On-Leave are included as part of the maximum time periods allowed for completion of a graduate degree.

Readmission

A student previously registered in the Graduate School who has failed to maintain graduate student status but who wishes to resume studies must file an application in person or by mail for readmission to the Graduate School by the regularly published closing dates. If the student is readmitted, registration will occur during the usual registration period. If the student has attended any other institution during the period when not registered at the UW, official transcripts in duplicate of the student's work must be submitted. An application for readmission carries no preference and is treated in the same manner as an application for initial admission, including the requirement of payment of the application fee.

The Graduate School normally allows six years to complete requirements for a master's degree and ten years for a doctoral degree. Periods spent On-Leave or out of status are included.

Concurrent Degree Programs

Formal Concurrent Degree Programs

Concurrent programs are defined as a pair of programs that may be taken at the UW by a postbaccalaureate student resulting in the satisfaction of the requirements for either two graduate degrees or a graduate and a professional degree. Rather than sequentially completing first one degree and then the other, the student's time and the University's resources may sometimes be conserved by providing arrangements that permit the student to proceed in a coordinated way toward completion of the degree objectives.

These specific programs have been formally approved and students are coded with the concurrent codes.

To earn two master's degrees, a student must complete two separate sets of minimum Graduate School degree requirements of 36 credits each for a total of 72 credits. If a program requires more than 36 credits for the master's degree, a graduate student, with prior approval of both graduate programs, may apply a maximum of 12 credits beyond 36 earned in one program toward the master's degree in the second program. Thus, the minimum number of additional credits for the second degree, with these 12 approved credits, is 24. Up to 12 credits earned toward a Ph.D. degree may be counted toward a master's degree in another program with the approval of both degree-granting units.

Informal Concurrent Degree Programs

Students in these programs pursue two degrees from different departments simultaneously. These programs have not been approved as formal concurrent programs, but students complete the same requirements as in the formal concurrent programs.

Students choosing this option must complete an Informal Concurrent Degree Application, which may be obtained from the Graduate Student Services Office, 229 Gerberding.

Graduate School Memorandum No. 35: Concurrent Degree Programs contains additional information and is available from the Academic Programs office in the Graduate School or may be found through the Graduate School homepage at www.grad.washington.edu.

Master's Degree

Summary of Requirements

It is the responsibility of each master's candidate to meet the following Graduate School minimum requirements:

1. Under a thesis program, a minimum of 36 or more quarter credits (27 course credits and a minimum of 9 credits of thesis) must be earned. Under a non-thesis program, a minimum of 36 or more quarter credits of course work must be earned.
2. At least 18 of the minimum 36 quarter credits for the master's degree must be for work numbered 500 and above. (In a thesis program, 9 of the 18 credits must be course credits and 9 may be for 700, Master's Thesis.)
3. Numerical grades must be received in at least 18 quarter credits of course work taken at the UW. The Graduate School accepts numerical grades (a) in approved 400-level courses accepted as part of the major, and (b) in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
4. A minimum of 30 credits must be earned at the University of Washington.
5. In a thesis degree program, a thesis, approved by the supervisory committee, must be submitted to the Graduate School. A student must register for a minimum of 9 credits of thesis (700). With the exception of summer, students are limited to a maximum of 10 credits per quarter of thesis (700).
6. A final master's examination, either oral or written, as determined by the student's supervisory committee, must be passed, if it is a departmental requirement.
7. Any additional requirements imposed by the graduate program coordinator in the student's major department or by the student's supervisory committee must be satisfied. A master's degree student usually takes some work outside the major department. The graduate program coordinator in the major department or the student's supervisory committee determines the requirements for the minor or supporting courses.
8. Students may now apply for the master's degree on the Web at www.grad.washington.edu/stsv/mastapp.htm. The online application period commences Monday, the third week of each quarter and closes Friday (midnight Pacific Time), the second week of the subsequent quarter (the quarter the student intends to graduate). For example, if competing in winter quarter, the earliest an online request can be submitted is the third week of autumn quarter and the latest is Friday of the second week of winter quarter. If degree requirements are not met in the requested quarter, students must complete another degree

request for the quarter in which they expect to complete requirements. Students will receive an email confirming receipt of their Master's Degree Request.

9. The graduate student must maintain registration as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).

10. All work for the master's degree must be completed within six years. This includes quarters spent On-Leave or out of status and applicable work transferred from other institutions (see detailed information under Transfer Credit).

11. A student must satisfy the requirements for the degree that are in force at the time the degree is to be awarded.

Second Master's Degree Requirement

A second master's degree may be earned at the UW by completing an additional separate set of requirements. Please refer to Concurrent Degree Programs earlier in this section and to Graduate School Memorandum No. 35 for more specific information.

Transfer Credit

A student working toward the master's degree may petition the Dean of the Graduate School for permission to transfer to the UW the equivalent of a maximum of 6 quarter credits of *graduate level* course work taken at another recognized graduate school. These credits may not have been used to satisfy requirements for another degree. The petition must include a written recommendation from the graduate program coordinator and an *official* transcript indicating completion of the course work. Transfer credits are not entered on the UW transcript.

Approved transfer credits are applied toward the total credit count for the master's degree only. (Transfer credits are not applicable toward a doctoral degree.) The 18 quarter credits of numerically graded course work, and the 18 quarter credits of 500-level-and-above course work may not be reduced by transfer credit.

UW students who are within 6 credits of completing their undergraduate degree and who have met the requirements for admission to the Graduate School may register the quarter immediately preceding admission to Graduate School for up to 6 credits in 500-level courses in addition to the last 6 credits they require of undergraduate work. The graduate program which has admitted the student must approve registration for the courses. The student, after admission to the Graduate School, must file a petition with the Dean of the Graduate School to transfer the 6 credits.

The student must also provide a letter from the Office of Graduations and Academic Records stating that these credits have not been applied toward his or her undergraduate degree.

Credit taken as a nonmatriculated student or postbaccalaureate student at the UW may not be transferred into a graduate program. Credit by either independent study through correspondence or advanced credit examinations is not transferable.

Thesis Program

The master's thesis should be evidence of the graduate student's ability to carry out independent investigation and to present the results in clear and systematic form. Two copies of the thesis, normally written in the English language, along with the appropriate forms signed by the members of the supervisory committee from the student's graduate program, must be submitted to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are completed. The faculty

in the graduate program may require that the student present an additional copy for its own use. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements. This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the thesis. The thesis must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School for consultation during the thesis preparation process.

A \$25 binding fee is payable at 129 Schmitz before the thesis is submitted to the Graduate School.

Non-thesis Programs

The faculty in some graduate programs have arranged programs of study for the master's degree that do not require the preparation of a thesis. These non-thesis programs normally include a more comprehensive plan of course work for more extensive examinations than are required in thesis programs, or they may include some approved research activity in lieu of a thesis.

Final Examination for Master's Degree

As soon as is appropriate, the graduate faculty in the student's graduate program appoints a supervisory committee, consisting of two to four members. The chair and at least one-half of the total membership must be members of the graduate faculty (see Graduate School Memorandum No. 13). The committee chair arranges the time and place of the final examination, the results of which must be reported to the Graduate School by the last day of the quarter (last day of exam week) in which degree requirements are met. At least two graduate-faculty members of the committee, including the chair, must sign the Master's Application (warrant). If the exam is not satisfactory, the committee may recommend to the Dean of the Graduate School that the student be allowed to take another examination after a further period of study.

Application for Master's Degree

Students may now apply for the master's degree on the Web at www.grad.washington.edu/stsv/mastapp.htm. The online application period commences Monday, the third week of each quarter and closes Friday (midnight Pacific Time), the second week of the subsequent quarter (the quarter the student intends to graduate). For example, if competing in winter quarter, the earliest an online request can be submitted is the third week of autumn quarter and the latest is Friday of the second week of winter quarter. If degree requirements are not met in the requested quarter, students must complete another degree request for the quarter in which they expect to complete requirements. Students will receive an email confirming receipt of their Master's Degree Request. The filing of the application is the responsibility *solely of the student*. When the application is received, the student's record is reviewed in the Graduate School. All requirements for the degree must be met by the end of the current quarter if the application is to be approved. If this is not possible, the applicant is notified of deficiencies by the Graduate School. Once approved, the application is forwarded to the appropriate graduate program. Registration must be maintained for the entire quarter in which application for the degree is made. If a student should withdraw during the quarter, the application becomes void and a new one must be submitted at the appropriate time.

Upon completion of departmental requirements, the master's degree application is signed by the supervisory committee and returned to the Graduate School. It must be received by the last day of the quarter (last day of exam week) if the degree is to be conferred that quarter. If all requirements are completed after this deadline, registration for the following quarter is required.

The student and the graduate program coordinator should be

thoroughly acquainted with the requirements for the particular degree.

Master of Arts for Teachers

Master's degree programs for experienced teachers, which focus upon the fields of knowledge normally taught in the common school and the community college, have been established at the University. These programs provide alternatives to the research-oriented Master of Arts and Master of Science degree programs, which emphasize particular fields of knowledge. Programs leading to the M.A.T. degree are offered in Biology Teaching and English.

Doctoral Degree

The doctoral degree is by nature and tradition the highest certificate of membership in the academic community. As such, it is meant to indicate the presence of superior qualities of mind and intellectual interests and of high attainments in a chosen field. It is not conferred merely as a certificate to a prescribed course of study and research, no matter how long or how faithfully pursued. All requirements and regulations leading to the doctoral degree are devices whereby the student may demonstrate present capacities and future promise for scholarly work.

Summary of Requirements

In order to qualify for the doctoral degree, it is the responsibility of the student to meet the following Graduate School *minimum* requirements:

1. Completion of a program of study and research as planned by the graduate program coordinator in the student's major department or college and the Supervisory Committee. Half of the total program, including dissertation credits, must be in courses numbered 500 and above. At least 18 credits of course work at the 500 level and above must be completed prior to scheduling the General Examination.
2. Presentation of 90 credits, 60 of which must be taken at the University of Washington.
With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may substitute for 30 credits of enrollment.
3. Numerical grades must be received in at least 18 quarter credits of course work taken at the UW prior to scheduling the General Examination. The Graduate School accepts numerical grades in approved 400-level courses accepted as part of the major, and in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
4. Creditable passage of the General Examination. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.
5. Preparation of and acceptance by the Dean of the Graduate School of a dissertation that is a significant contribution to knowledge and clearly indicates training in research. Credit for the dissertation ordinarily should be at least one-third of the total credit. *The Candidate must register for a minimum of 27 credits of dissertation over a period of at least three quarters.* At least one quarter must come after the student passes the General Examination. With the exception of summer quarter, students are limited to a *maximum* of 10 credits per quarter of dissertation (800).
6. Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation and the field with which it is concerned. The General and Final Examinations cannot be scheduled during the same quarter. Registration as a graduate student is required the quarter the exam is taken and the degree is conferred.
7. Completion of all work for the doctoral degree within ten years. This includes quarters spent On-Leave or out of status as well as applicable work from the master's degree from the UW or a master's degree from another institution, if applied toward one year of resident study.

8. Registration maintained as a full- or part-time graduate student at the University for the quarter in which the degree is conferred (see detailed information under Final Quarter Registration).
9. A student must satisfy the requirements that are in force at the time the degree is to be awarded.

Appointment of Doctoral Supervisory Committee

A *Supervisory Committee* is appointed by the Dean of the Graduate School to guide and assist a graduate student working toward an advanced degree and is expected to evaluate the student's performance throughout the program. The supervisory committee should be appointed no later than four months prior to the General Examination. Appointment of the supervisory committee indicates that the graduate faculty in the student's field finds the student's background and achievement sufficient for admission into a program of doctoral study and research. "Preliminary" examinations, if required, should be completed prior to the request for appointment of the supervisory committee (see Graduate School Memorandum No. 13: Supervisory Committees for Graduate Students).

Admission to Candidacy for Doctoral Degree

At the end of *two years of graduate study*, the chair of the supervisory committee may present to the Dean of the Graduate School, for approval, a Request for General Examination (signed by all supervisory committee members including the Graduate School Representative) permitting the student to take the General Examination for admission to candidacy for the doctoral degree. This means that, in the opinion of the committee, the student's background of study and preparation is sufficient to justify the undertaking of the examination. A warrant is issued to the department if the Graduate School requirements have been met. The Request for General Examination must be received at least three weeks prior to the proposed examination date. Written and other examinations prior to the oral are the responsibility of the graduate program and do not need Graduate School approval. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations. Registration as a graduate student is required the quarter the exam is taken and candidacy is conferred.

If the student's performance is judged by the supervisory committee to be satisfactory, the signed warrant certifying successful completion of the General Examination is filed in the Graduate School. If the General Examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit up to a maximum of two additional re-examinations, after a further period of study. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School.

Thereafter, the student is identified and designated as a *Candidate* for the appropriate doctoral degree and is awarded the Candidate's certificate. After achieving Candidate status, the student ordinarily devotes his or her time primarily to the completion of research, writing of the dissertation, and preparation for the Final Examination.

The Candidate's certificate and the doctoral degree may not be awarded in the same quarter.

Candidate's Certificate

The Candidate's certificate gives formal recognition of the successful completion of a very significant step toward the doctoral degrees awarded through the Graduate School: Doctor of Philosophy, Doctor of Education, and Doctor of Musical Arts. Students who have passed the Graduate School General Examination and who have completed all requirements for the

degree except the dissertation and the Final Examination are awarded the Candidate certificate.

Dissertation and Final Examination

The Candidate must present a dissertation demonstrating original and independent investigation and achievement. The dissertation should reflect not only mastery of research techniques but also ability to select an important problem for investigation and to deal with it competently. Normally the dissertation is written in the English language. However, if there are circumstances that warrant the dissertation be written in a foreign language, approval must be received from the Dean of the Graduate School. The Graduate School publishes a booklet, *Style and Policy Manual for Theses and Dissertations*, which outlines format requirements. This manual should be obtained from the Graduate School and read thoroughly *before* the student begins writing the dissertation. The dissertation must meet all format requirements before being accepted by the Graduate School. Thesis advisers are available in the Graduate School, and students are encouraged to consult with them throughout the dissertation preparation process.

When the supervisory committee agrees that the doctoral Candidate is prepared to take the Final Examination, the Dean of the Graduate School should be informed of the decision and asked to designate a reading committee consisting of at least three voting members of the supervisory committee.

Once the reading committee is established officially with the Graduate School, a Request for Final Examination (signed by all members of the supervisory committee including the Graduate School Representative) is presented to the Graduate School three weeks prior to the Final Examination date, and if the Candidate has met all other requirements, a warrant authorizing the Final Examination is issued by the Graduate School. At least four members of the committee (including the chair, GSR, and one additional graduate faculty member) must be present at both the General and Final Examinations.

If the Final Examination is satisfactory, the supervisory committee signs the warrant and returns it to the Graduate School by the last day of the quarter in which the degree requirements are completed. Any members of the committee who do not agree with the majority opinion are encouraged to submit a minority report to the Dean of the Graduate School. If the examination is unsatisfactory, the supervisory committee may recommend that the Dean of the Graduate School permit a second examination after a period of additional study.

After the Final Examination, the doctoral Candidate has 60 days in which to submit the dissertation to the Graduate School. Registration as a graduate student is required the quarter the dissertation is submitted and the degree is conferred.

Publication of Doctoral Dissertations

Part of the obligation of research is publication of the results, and in the case of doctoral research, this means microfilm publication of the dissertation and/or abstract. This is a Graduate School requirement in addition to any previous or planned publication of any or all of the dissertation and provides worldwide distribution of the work. The Candidate submits the publication agreement when the dissertation is presented to the Graduate School. Publication in microfilm does not preclude other forms of publication.

The following fees for microfilming the doctoral dissertation are paid at the Cashier's Office, 129 Schmitz (all fees are subject to change): microfilming the entire dissertation, \$60; *optional* copyright fee (applicable only when the entire dissertation is microfilmed), \$45; or microfilming of only the abstract, \$60. *These fees are in addition to the \$25 binding fee.*

Individual Ph.D. Program

The Graduate School maintains the Individual Ph.D. (IPh.D.) Program for exceptionally able students whose objectives for study are of an interdisciplinary nature that cannot be met within one of the University units authorized to grant the Ph.D. degree. The program is intended for dissertation topics that require supervision from two or more of the disciplines in which the University offers the Ph.D. degree. It is not intended as a mechanism for offering the Ph.D. degree within units that do not have their own authorized Ph.D. programs.

A graduate student may apply to the IPh.D. Program when he or she has completed the master's degree, or has been admitted to the Graduate School and has completed at least three quarters of full-time work at the UW, and has carefully planned an appropriate program of studies.

Proposals, including GRE scores, are due by December 15 of each year, and decisions on admission are made by May 31 of the following year. Information and application materials for the Individual Ph.D. Program are available at www.grad.washington.edu/inter/iphd.htm.

Program Descriptions

College of Architecture and Urban Planning

224 Gould

Dean

Robert Mugerauer

Associate Deans

Katrina Deines

Steven Goldblatt

The College of Architecture and Urban Planning (CAUP) comprises four departments that are directly concerned with the design and development of the physical environment: Architecture, Construction Management, Landscape Architecture, and Urban Design and Planning.

The College offers a variety of programs and degrees focusing on the environmental design disciplines within a liberal arts education. The undergraduate programs of the departments of Construction Management and Landscape Architecture lead to professional degrees that serve as the educational credentials for careers in their respective fields. The pre-professional undergraduate degree in architectural studies prepares students for professional programs as well as related roles in society. Master's degrees are also offered in the College: Master of Architecture, Master of Science in Architectural Studies, Master of Science in Construction Management (evening degree), Master of Urban Planning, and Master of Landscape Architecture. Master's students may elect to work toward the Certificate in Urban Design or the Certificate in Preservation Planning and Design. A new Ph.D. program in built environment is offered as well as an interdisciplinary Ph.D. in urban design and planning that is available through the Graduate School. All curricula encompass an appropriate level of design and technical understanding and include broader social, economic, and cultural issues fundamental to understanding, preserving, and enriching our built and natural environments.

As part of a major university and metropolis in the Pacific Northwest, the College is able to reinforce its program by using its setting as a laboratory for study. It works closely with its various professional communities to build curricula and a faculty attuned to the understanding and creation of an appropriate physical environment.

Research centers include:

- * Runstad Center for Real Estate and Community Development
- * Center for Environment, Education, and Design Studies
- * Institute for Hazard Mitigation Planning and Research
- * Urban Ecology Research Laboratory
- * Institute for Collaborative Building
- * Northwest Center for Livable Communities

Educational programs include:

- * Certificate programs
- * Urban design
- * Preservation planning and design
- * Continuing education/extension programs
- * Architecture
- * Facilities management
- * Real estate

Institute for Hazard Mitigation Planning and Research

Robert Freitag, Director

The Institute for Hazard Mitigation Planning and Research was established in 1999 as a vehicle for research, teaching, and public service that address the mitigation of natural and man-made hazards through planning and design, and through the integration of mitigation principles into a wide range of disaster and risk-management opportunities. The institute's approach is interdisciplinary, with close links to other academic research units in the University and to risk management organizations in government and industry.

The research agenda is aimed at developing practical mitigation solutions that can be incorporated into local government land-use planning,

development regulation, infrastructure, and emergency management; state and federal response to disasters; planning for business continuity; and planning for post-disaster recovery and reconstruction.

The institute is also pursuing curriculum development to incorporate mitigation principles and methods into existing and new courses in the College's degree programs.

Urban Design Certificate Program

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Jeffrey Ochsner, Director

Neile Graham, Program Coordinator

The College of Architecture and Urban Planning administers a special graduate-level program that leads to the Certificate of Achievement in Urban Design. Since 1968, this interdisciplinary program has provided a collective framework that allows students to specialize in the study and design of the urban environment as part of their professional education.

The 14-member faculty offers backgrounds in urban design as well as in architecture, landscape architecture, and urban planning. In addition, the communities of the Puget Sound region provide a unique learning laboratory for students to experience the issues and professional activities of urban design. A core curriculum and mandatory course work in four substantive areas provide the student with a firm grounding in theory, methods, and practical skills. The program is normally seven quarters in length, concurrent with the master's program.

Students accepted for graduate work by the departments of Architecture, Landscape Architecture, or Urban Design and Planning are eligible for the program if they possess the necessary design abilities prior to enrollment in advanced studios.

International Programs

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The departments of the College offer many opportunities for foreign study in which participants earn academic credit while studying abroad. Programs in Rome and Mexico are sponsored on a regular basis. In addition, various study and exchange opportunities exist in such locations as Germany, the Scandinavian countries, Colombia, Mexico, India, and Japan. Faculty exchanges with foreign institutions occur regularly.

University of Washington Rome Center

95 Piazza del Biscione, Rome, Italy

Katrina Deines, Director

The College maintains a permanent year-round facility in Rome. Studio and classroom spaces, a library, administrative offices, and housing accommodations for faculty are located in the Palazzo Pio on the Campo de Fiori. The Rome Center is used by UW programs in classics, Romance languages, art, art history, English, creative writing, and comparative history of ideas, as well as by the departments of the College of Architecture and Urban Planning. The Rome Center fosters interaction among students from the University and other institutions, together with practicing professionals residing in or visiting Rome. Several major universities regularly share studio critics and lecturers.

Remote Sensing Applications Laboratory

12 Gould

Frank Westerlund, Director

The Remote Sensing Applications Laboratory (RSAL) is a facility for teaching, research, and public service applications of remote sensing and geographic information technologies in environmental planning and design. Remote sensing includes aerial photography and satellite systems that

record earth-surface data in image or digital form for subsequent interpretation by visual or computer techniques and incorporation into geographic information systems. Research applications have included land-use mapping, urban form analyses, growth-management studies, development siting, natural-resource inventories, and environmental analysis. RSAL houses an extensive collection of air photo, satellite data, map, and documentary resources. In addition to optical photo interpretation equipment, the laboratory utilizes UNIX and NT workstation-based software systems such as ERDAS image processing and ArcInfo GIS.

Facilities

Computing

Mark Baratta, Director

The CAUP Office of Computing provides a wide variety of specialized computing resources and support services for the College's students, faculty, and staff. These resources include the following:

- * several networked Windows and Macintosh computing labs with a wealth of software, including CAD, GIS, multimedia, 2D/3D graphics, rendering, animation, scheduling, estimating, bid analysis, project management, modeling, design, spreadsheet, and document preparation packages;
- * slide and document scanning facilities;
- * printing and large-format color plotting;
- * digital still and video cameras and processing software;
- * Student Computing Loaner Program, which provides checkout of laptop computers, digital still and video cameras, and video/computer projectors to CAUP students;
- * consulting office for in-person support, along with support via phone and email.

Additionally, students receive UWNNetID computing accounts from the University's central computing organization, Computing and Communications. The UWNNetID allows attachment to the campus network (either locally or via dial-up) and access to email, disk space for file storage and Web pages, and many computing, course scheduling, bibliographic, and library resources.

Lighting Applications Laboratory

The Lighting Applications Laboratory includes a variety of facilities for use by students and faculty members in conjunction with lighting classes, design-studio courses, and research work. Equipment in the lighting workshop includes lamps and lighting fixtures, sample models and model-building materials, a mirror-box artificial sky, a direct-beam sunlight simulator, assorted light meters and data loggers, cameras, and demonstration displays.

The Department of Architecture is a co-sponsor of the Lighting Design Lab. This lab, a 10,000-square-foot, half-million-dollar facility, was designed to demonstrate the energy conservation potential of state-of-the-art architectural lighting technology. It is operated by Seattle City Light in downtown Seattle. Students can take various positions in the lab as interns. It is also available to assist in their lighting design and testing, as it does with regional architectural offices.

Photography Laboratory

A large photography laboratory is provided with studio and darkroom facilities for use by photography classes, design-studio classes, special instruction, and independent activity.

Shop

A fully staffed and equipped wood-, plastic-, and metal-working shop provides students an opportunity to design and build selected projects. The shop is used as an instructional facility in conjunction with studio, structures, and materials classes. Thesis and other individual activity also can be accommodated.

Library

The Architecture-Urban Planning Library, 334 Gould, is the primary location for materials on architecture, landscape architecture, construction management, and urban design and planning. The collection contains 42,500 volumes, 7,500 microforms, and 300 currently received serial subscriptions. Access to its collection is provided through the UW Libraries

Information Gateway, a single World Wide Web location which encompasses all the library's print and electronic resources as well as tools, services, and the ability to search the library's catalog and a wide range of Internet resources. The Gateway is available in all UW libraries and on the Web at www.lib.washington.edu.

Slide Collection

Heather Seneff, Director

The slide collection consists of approximately 100,000 images covering architectural, landscape, design and planning, and construction subject matter, supporting the curricular and research needs of the College. New materials for lectures and projects are continually added.

Student Organizations

Chapters of American Institute of Architects Students, American Society of Landscape Architects, Associated General Contractors, Planning Students Association, and the Historic Preservation Association provide opportunities for undergraduate and graduate students to meet informally and to participate in a variety of projects and events.

College Bachelor of Arts Programs

Bachelor of Arts in Architectural Studies, see Architecture.

Bachelor of Arts in Community and Environmental Planning, see below.

Community and Environmental Planning

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Community and Environmental Planning (CEP) is an award-winning, interdisciplinary Bachelor of Arts degree program offered through the College as one of the University's interdisciplinary undergraduate programs. CEP has gained distinction as a model for a highly personalized, active, and relevant educational experience within a large research institution. Housed in the Department of Urban Design and Planning, CEP students draw liberally upon the entire range of courses, faculty, and programs at the UW.

Undergraduate Program

Adviser
410 Gould, Box 355740
206-543-4191

The Community and Environmental Planning program offers the following programs of study:

- * The Bachelor of Arts degree with a major in community and environmental planning

Bachelor of Arts

Suggested First- and Second-Year College Courses: See adviser.

Department Admission Requirements

See adviser.

Major Requirements

Students design two-year-long individual study plans with faculty. Each builds a unique, strong degree experience with intellectual integrity, combining the quarterly CEP core seminars with a self-selected set of rigorous courses -- including 25 credits of methods -- and outside experiences.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The problems we face in this world are simply too great to be met without active engagement from all perspectives and knowledge. To this end, a CEP education is founded on the following: start where you are; articulate and embrace a vision of how you intend to make a difference in the world; construct a plan, with guidance from faculty and peers, of CEP seminars, cross-disciplinary courses, and field experiences; move deliberately with it in the final two years of

undergraduate education; through first-hand experience and in the context of the CEP community of learners, become acquainted with effective ways for working constructively together to anticipate and address critical issues facing the complex communities and world we inhabit.

A CEP education is fully lived, not passively taken. CEP students actively make their education in community with others. Students learn from learning groups of seventeen. Each group comprises a community of mutual learning that requires commitment, personal investment, and strong teamwork strategies for two years. Through six interconnected, quarterly seminars students engage the core content of the major: community, environment, and planning. These contemporary academic fields and areas of research include the study of community as subject and practice, exploration of the ecological context of all societal life, and an investigation of the potentials of planning for developing strategies for positive change.

CEP students have gone on to careers in a variety of interdisciplinary fields such as community planning and organization, urban development, communications, work in the for-profit and nonprofit sectors, public administration, education, community and environmental activism, ecology, and government/community relations.

* *Instructional and Research Facilities*: See above.

* *Honors Options Available*: None offered.

* *Research, Internships, and Service Learning*: See above.

* *Department Scholarships*: None offered.

* *Student Organizations/Associations*: None offered.

Course Descriptions

See page 263.

Preservation and Planning Certificate

The College of Architecture and Urban Planning offers education in preservation planning and design. This reflects a conscious choice to emphasize preservation within the context of individual design professions. The curriculum offers an awareness and familiarity with issues involved in identification, designation, interpretation, and preservation of historic places, as well as restoration, adaptive reuse, and design of sympathetic new construction in historic contexts.

Program Coordinator
Box 355740
206-543-5996

Admission Requirements

Open to students accepted into a graduate program in the College of Architecture and Urban Planning. Application is made first for admission to a degree program within the college. Once accepted, a separate "Statement of Interest" form is required. Application is made within the first two weeks of classes for two-year degree programs, and by the end of the first year for three-year programs.

Certificate Requirements

12-15 credits, as follows:

- * **Track I: Requirements for Students in the M.Arch. Degree Program**
 - o *Required courses*: ARCH 500 (6), ARCH 582 (3), ARCH 590 (3); either ARCH 457 (3) or ARCH 488 (3); URBDP 587 (3); either URBDP 585 (3) or URBDP 586 (4); an advanced studio on preservation design or design in an historic context
 - o *Elective courses*: Two additional electives in areas related to preservation in architecture, planning, or related design.
 - o *Thesis*: Thesis topic with content in the area of preservation design or related issues in historic preservation. Thesis committee chaired by a member of the Preservation Planning and Design faculty.
- * **Track II: Requirements for Students in the M.L.A., M.U.P., and Ph.D. Degree Programs**
 - o *Core courses*: URBDP 585 (3), URBDP 586 (4), one graduate seminar in preservation planning, URBDP 512 (3)
 - o *Mandatory course areas*: either one graduate course in each of the following areas or a three-quarter sequence in one area: U.S. history; urban history/history of city planning; architectural history
 - o *Preservation planning and design*: 5 credits of a preservation studio or some combination of design-related courses
 - o *Optional internship* (5 credits)

- o *Thesis*: Thesis topic with content in the area of preservation planning and design or related issues in historic preservation. Thesis must be chaired by a member of the Preservation Planning and Design faculty.

Architecture

208 Gould

Architecture includes the study of design, graphics, computing, building structures, construction materials, environmental control systems, history, theory, and professional practice. It also draws from a broad range of fields including ecology, sociology, psychology, cultural studies, and law.

Undergraduate Program

Adviser
208 Gould Hall, Box 355720
206-543-3043
bainfo@u.washington.edu

Advising for the first two years of the program is done through the Undergraduate Gateway Center, 171 Mary Gates Hall.

The Department of Architecture offers the following programs of study:

- * The Bachelor of Arts degree with a major in architectural studies
- * A minor in architecture

The B.A. in architectural studies is a pre-professional degree that prepares candidates for admission with advanced standing to professional architectural programs. It is also good preparation for other roles in society, government, development, management, planning, art, graphic design, digital arts, and the like. These benefit from an understanding of and exposure to architectural design and problem solving.

Students may also choose a dual major in both Architecture and Construction Management and can receive both the B.A. with a major in Architectural Studies and the B.S. in Construction Management. Five years of study is usually the minimum necessary to complete the requirements for both degree programs.

Bachelor of Arts

Suggested First- and Second-Year College Courses: See Department Admission Requirements below.

Department Admission Requirements

1. 90 credits to include the following:
 - a. Preparatory Architectural Course Work (17 credits): ARCH 350, ARCH 351, ARCH 352 (9 credits); ARCH 210, ARCH 211 (8 credits). Note: These courses can be taken through UW Extension on a nonmatriculated basis, prior to admission to the UW, or they can be taken in the sophomore year on campus.
 - b. General Education Requirements (70 credits): English composition (5 credits); Visual, Literary, and Performing Arts (VLPA) (20 credits); Individuals and Societies (I&S) (20 credits); Natural World (NW) (20 credits, including MATH 112, MATH 124, or MATH 145); additional Areas of Knowledge (5 credits).
 - c. Electives (3 credits)
2. While the cumulative GPA is an important factor in the admission evaluation, the committee places emphasis on the evaluation of performance in the preparatory architectural course work the student has completed. It is to the student's advantage to take as many of these courses as possible before applying.
3. Application deadline: May 15 for autumn quarter only. Prerequisite courses must be completed by the time the student enters the program in autumn quarter.

Major Requirements

90 credits as follows:

1. 66 credits of pre-professional course work
2. 24 credits of approved upper-division electives
3. The final 45 credits must be completed as a matriculated student in residence at the UW.
4. Minimum 2.50 cumulative GPA for all work done in residence.

Minor

Minor Requirements: 25 credits to include a minimum of 20 credits in ARCH courses (at least 9 credits at the upper-division level) and 5 additional upper-division credits from courses in the College.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:*The architectural studies program emphasizes a broad liberal arts foundation followed by a focus on entry-level courses in architectural design, theory, the technology of building, and materials. Specific goals for student learning include an understanding of the organization of three-dimensional space in response to specific human needs; the sequences and history of human building activities; various architectural theories and current thought about the aesthetics of design; construction materials and their properties; building systems and their integration for human comfort; structural principles, relationships of buildings to their sites; social, political, legal, and economic influences of design and construction. Specific goals in the area of personal development include an ability to visualize three dimensions and think spatially; graphic, verbal, and written communication skills for design development and presentation; an ability to think critically and exercise self-criticism.
- * *Instructional and Research Facilities:* Departmental and College facilities include the following:
 - o Design Machine Group, a collaborative design and computing research lab and studio aimed at fostering and developing ideas that will shape the future of design and information technology.
 - o UW Rome Center, housed in the Palazzo Pio on the Campo de' Fiori of Rome, provides studio and classroom spaces for students participating in Italian studies programs.
 - o The Lighting Applications Laboratory is operated by the department for use by students and faculty in conjunction with lighting classes, design studio, courses, and research work.
 - o Photography Laboratory: A large and well-equipped laboratory for black-and-white photography operated by the department for the College provides studio and darkroom facilities for use by photography classes, design studio classes, special instruction, and independent activity.
 - o Wood and Metal Shop: Large and well-equipped wood and metal working shops are available for student and class projects.
- * *Honors Options Available:* None offered
- * *Research, Internships, and Service Learning:* Internships are available and vary according to individual interests within the program. See adviser for details.
- * *Department Scholarships:* A limited number of department scholarships are available to eligible students entering their final year of the major.
- * *Student Organizations/Associations:* AIAS (American Institute of Architectural Students)

Of Special Note:

Most states require that an individual intending to become an architect hold an accredited degree. Two types of degrees are accredited by the National Architectural Accrediting Board (NAAB): (1) the Bachelor of Architecture, which requires a minimum of five years of architectural study (this degree is not offered at the University of Washington), and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related pre-professional bachelor's degree. These professional degrees are structured to educate those who aspire to registration and licensure to practice as architects.

The UW's four-year, pre-professional degree is not accredited by NAAB. The pre-professional degree is useful to those desiring a foundation in the field of architecture as preparation for either continued education in a professional degree program or for employment options in fields related to architecture.

Architectural education at the University of Washington requires a minimum of six years of higher education to attain the first professional degree, the Master of Architecture. The curriculum is divided into three two-year segments of course work with a pre-professional Bachelor of Arts degree (with a major in Architectural Studies) awarded at the completion of the second two-year segment. The professional degree, Master of Architecture, is awarded only upon completion of the third segment. (Students with bachelor's degrees in unrelated fields take an additional year of course work.)

Graduate Program

Graduate Program Coordinator
208 Gould, Box 355720
206-543-4180
archinfo@u.washington.edu

The Department of Architecture offers two graduate level degrees: the Master of Architecture (M.Arch.) degree, a professionally accredited architecture degree; and the Master of Science (M.S.) degree in Design Computing, an advanced research-oriented degree for those who already hold a professional or pre-professional degree in architecture or an allied design discipline (or can show evidence of equivalent preparation for work in design computing). Those interested in professional careers in architecture should apply to the Master of Architecture program.

Master of Architecture

The Master of Architecture degree is the only professional degree offered by the Department of Architecture. Completion of the requirements of this nationally accredited degree program satisfies the educational requirement for licensing (registration) as an architect. The accredited M.Arch. program accommodates two groups of undergraduate degree holders: (1) persons holding a pre-professional four-year degree, such as a Bachelor of Arts in Architecture (or equivalent), who normally will require seven or eight quarters of study; (2) persons with an undergraduate degree in an unrelated field, who normally will require ten or eleven quarters, over a period of at least three years, to complete the requirements for the degree. This three-year program may vary somewhat in duration and specific course work required, depending on selection of concentration/study areas and prior academic and professional experience.

Candidates with a pre-professional four-year degree, such as Bachelor of Arts (in architecture) or the equivalent, usually undertake six full-time quarters of study including completion of a thesis for the M.Arch. degree. This program typically requires 91 credits of course work, including 30 credits of design studio, 30 credits of approved core courses, 9 credits of thesis, and 15 credits of electives. Special interests and certificate programs often can be accommodated within the 15 credits of electives and design-studio options.

Persons holding degrees in other fields normally take three quarters of preparatory course work to develop knowledge and skills equivalent to those of students who enter the program from undergraduate architecture programs. Upon completion of preparatory course work, the students merge with students in the two-year program described above.

The department offers an advanced M.Arch. degree program for persons holding an accredited professional five-year Bachelor of Architecture degree (and those already holding an accredited Master of Architecture degree). For these candidates the program represents a specialization or in-depth study of a specific area or interest in the field. Each student's program is developed on an individual basis in consultation with faculty advisers. The approved program of study becomes the student's curriculum, which must be completed for award of the degree. Typically this program involves a minimum of 45 credits of required course work, including a thesis, and can be completed in four or five quarters. Those seeking advanced study of design computing should apply to the Master of Science (M.S.) in Architecture degree program, not the post-professional M.Arch.

Admission Requirements

- * Scholastic record and aptitude as evidenced by transcripts from baccalaureate (or higher) degree and GRE test scores, to be taken within the last five years. Primary emphasis is placed on more recent and architecturally-related coursework.
- * Minimum grade point average of 3.00 (B) or better in the last 90 graded quarter hours or last 60 semester hours.
- * A portfolio of work in visual arts and/or design. The portfolio is of primary significance for candidates from design backgrounds who desire advanced standing; however, applicants from other fields must show some graphic evidence of interest and aptitude in the design arts as well.
- * The applicant's Statement of Purpose for clarity, purpose and the extent to which the program can be expected to prepare him/her for those objectives.

The Statement of Purpose is particularly significant for those applying for the post-professional M.Arch. program. Where appropriate the candidate should include a proposed schedule of coursework and identify faculty that will be involved in the study.

- * The applicant's background and experience in architecture and related fields.
- * Written recommendations from three persons who can evaluate the applicant's past record and future promise of success in the program.

Degree Requirements

91-145 credits, as follows:

- * *For students without an architecture background a preparatory year is required (54 credits):* ARCH 303 (6), ARCH 304 (6), ARCH 305 (6), ARCH 310 (3), ARCH 311 (3), ARCH 312 (3), ARCH 320 (3), ARCH 321 (3), ARCH 322 (3), ARCH 331 (3), ARCH 332 (3), ARCH 350 (3), ARCH 351 (3), ARCH 352 (3), ARCH 360 (3)
- * *First-year requirements:* ARCH 420 (4), ARCH 432 (3), ARCH 433 (3), ARCH 500 (6), ARCH 501 (6), ARCH 502 (6), ARCH 530 (3), ARCH 570 (3), ARCH 590 (3), ARCH 591 (3), electives (6)
- * *Second-year requirements:* ARCH 503 (6), ARCH 504 (6), ARCH 595/599 (3), ARCH 700 (9), professional practicum selectives (6), graduate seminar selectives (6), electives (9)

Master of Science

The Master of Science (M.S.) in Architecture program offers an advanced and specialized graduate degree in architecture. The M.S. in Architecture is currently offered with a single area of specialization, design computing. Applicants should hold a degree in architecture or an allied design discipline. Candidates from a wide range of disciplinary backgrounds who are interested in pursuing education in research and applications of design computing that include design methods, cognition and computation, design collaborations, human/computer interface in design, visual architecture, physical computing, and related areas are encouraged to apply.

Admission Requirements

- * Scholastic record and aptitude as evidenced by transcripts from baccalaureate (or higher) degree and GRE test scores (Graduate Record Examination) taken within the last five years
- * A baccalaureate degree from an accredited United States college or university (or its equivalent in a foreign institution)
- * Minimum grade point average of 3.00 (B) or better in the last 90 graded quarter hours or last 60 semester hours
- * A portfolio of work in design in architecture or an allied discipline (or similar work appropriate to the program). The portfolio should include evidence of the applicant's preparation for the study in design computing.
- * The applicant's Statement of Purpose for clarity, purpose and the extent to which the M.S. in Design Computing program can be expected to prepare him/her for those objectives
- * The applicant's background and experience in architecture or an allied discipline (or related experience appropriate to the program), as well as preparation for advanced work in design computing, information technology, digital media or the like.
- * Written recommendations from three persons who can evaluate the applicant's past record and future promise of success in the M.S. in Design Computing program

Degree Requirements

45 credits, as follows:

- * *Core Curriculum:* ARCH 587 (3), ARCH 588 (3), ARCH 599 (3)
- * *Required Coursework:* One of the following: ARCH 402 (6), ARCH 403 (6), ARCH 503 (6), ARCH 504 (6), ARCH 505 (6); ARCH 481 (3); ARCH 484 (3); ARCH 486 (3); either ARCH 482 (3) or ARCH 483 (3)
- * *Electives:* 9 credits to be chosen from Design Computing courses, or any other relevant courses.
- * *Thesis:* 9 credits of ARCH 700

Certificate Programs

Graduate students may elect to participate in the College-wide certificate programs in urban design and preservation planning and design. (See

program descriptions in the preceding College section.) The department also offers a certificate program in lighting design.
International Studies

The department offers the Architecture in Rome program at the University of Washington Rome Center, and the Design/Build Mexico program in Cuernavaca, Mexico. Other programs have included summer study of the Italian Hill Towns and in Portugal and Scandinavia, and numerous exchanges including Scandinavia, England, Germany, Hong Kong, Colombia, Japan, and Australia.

Financial Aid

Each spring quarter the department awards scholarships and assistantships for the following academic year. These are more typically available to students already enrolled in the architecture program at the time of the awarding, although some financial aid is offered to newly entering students. Other financial aid and assistantship possibilities may be found through the Graduate School Fellowship Division and the Office of Student Financial Aid in Schmitz Hall.

Course Descriptions

See page 258.

Built Environment

410 Gould Hall

The Ph.D. in the Built Environment is a new (2003) college-wide, interdisciplinary degree program housed within the College of Architecture and Urban Planning. The Ph.D. program provides students with a common core of substantial, integrated knowledge concerning the multi-faceted built environment and then offers areas of specialization in three discrete fields of knowledge and practice:

- * Sustainable Systems and Prototypes (across a range of scales, from building elements & assemblages, to buildings, site & neighborhood context, city, and region)
- * Computational Design and Research (covering the spectrum of design, planning, and construction processes, practices, and pedagogy)
- * History, Theory, and Representation studies (focusing on issues of regional-global modernity)

Graduate Program

Graduate Program Coordinator
410 Gould Hall, Box 355740
206-543-5996

Doctor of Philosophy

Admission Requirements

- * Three letters of recommendation (Please use this downloadable form.)
- * Curriculum vitae
- * An exhibit of work which best illustrates the applicant's interests and abilities in areas related to the built environment must be submitted. This can be an essay, a paper, a publication, a report, or a project for which the applicant has had major responsibility. The exhibit will not be returned and should fit in letter-size files.
- * Statement of Purpose
- * Graduate Record Exam (GRE) scores
- * Prospective international, immigrant and permanent resident students whose native language is other than English and who have not received a bachelor's or master's degree from an accredited institution where the native language is English must submit a satisfactory TOEFL score (Test of English as a Foreign Language). The minimum allowable TOEFL score is 500. Students admitted with scores below 580 will be tested for English proficiency upon arrival and will be required to complete any assigned ESL courses along with their regular academic program.

Program Requirements

90 credits minimum, as follows:

- * **Core courses (21 credits):**

- o B E 551 (3), B E 552 (3), B E 553 (3)
- o B E 550 (6 quarters at 1 credit each)
- o *Research methods and design*: choice of 6 credits from list, including both qualitative and quantitative coursework
- * **Specialization (minimum 30 credits)**: The specialization is in one of three fundamental areas (sustainable systems and prototypes; computational design and research; history, theory, and representation). Each student selects one of these areas, within which she or he takes their advanced and specialized coursework and, eventually, conduct their dissertation research project. Each student must take 30 credits in the chosen area of specialization during the first several years in the program, before undertaking the qualifying examinations. A broad selection of courses, both within the College of Architecture and Urban Planning and in other University of Washington units, is available to provide the content of the three areas of specialization.
- * **Examinations**: The qualifying examination consists of written responses to three questions, followed by an oral examination on the material. The written and oral examinations are composed, conducted, and evaluated by the student's formally appointed dissertation committee.
- * **Dissertation (30 credits)**: Dissertation involves 30 credits and concludes with a final oral defense.

Course Descriptions

See page 262.

Construction Management

116 Architecture

Construction management is a diverse discipline focused on the delivery of projects that compose the world's built environment. Included are the determination of project requirements, management of design, procurement of materials, and management of the construction of the project within cost, time, and design parameters. In terms of dollar value output, the construction industry is the largest single production activity in the U. S. economy -- accounting for almost 10 percent of the gross national product. The construction industry is heterogeneous and enormously complex. The major classifications of construction differ markedly from one another: residential, commercial, industrial, and infrastructure, as well as specialties such as electrical, mechanical, framing, excavation, and roofing. Construction Management is the study of how projects are conceived, designed and built; the types of materials and methods used; techniques for estimating the cost of construction; design and contract law; construction accounting; oral and written communications; safety requirements; project planning, and project management.

Undergraduate Program

Adviser
116 Architecture, Box 351610
206-543-6377
uwcm@u.washington.edu

The Department of Construction Management offers the following program of study:

- * The Bachelor of Science in Construction Management degree

Students complete the first two years of study as an undeclared major in the College of Arts and Sciences or a community college. During these two years, students complete program prerequisite requirements. Upon admission to the major, students take the prescribed curriculum shown below.

Bachelor of Science

Suggested First-and Second-Year Courses: M E 123; PHYS 114, PHYS 115, PHYS 117, and PHYS 118; CHEM 120; ECON 100; ENGL 131, ENGL 281; ESS 101; MATH 112, MATH 124, or MATH 145; ACCTG 215 and ACCTG 225, CM 250, COM 220, MGMT 200, QMETH 201.

Department Admission Requirements

1. Completion of a minimum of 90 credits in the following categories (courses must be completed by the beginning of autumn quarter to be eligible for admission that quarter):

- a. *Construction Science*: M E 123.
 - b. *Business and Management*: ACCTG 215 and 225; MGMT 200.
 - c. *Individuals & Societies (I & S)*: ECON 100, 200, or 201; 10 additional I & S credits from UW Areas of Knowledge list (CM 250 recommended).
 - d. *Natural World (NW)*: PHYS 114, PHYS 115, PHYS 117, and PHYS 118; MATH 112, MATH 124, or MATH 145 or Q SCI 291; ESS 101; QMETH 201; 10 additional NW credits from UW Areas of Knowledge list (CHEM 120 or ENV S recommended).
 - e. *Language Skills*: 5 credits from English composition list; 5 credits from "W" courses or English composition list (ENGL 131 and ENGL 281 recommended).
 - f. *Visual, Literary & Performing Arts (VLPA)*: COM 220; 5 additional VLPA credits (from UW Areas of Knowledge list).
2. Preference is given to applicants who have successfully completed lower-division prerequisite requirements. Admission decisions are based on an applicant's academic performance and potential, extent and quality of relevant experience, apparent attitude, and personal motivation. Completion of prerequisite requirements does not guarantee admission.
 3. *Departmental application deadline*: April 1, for the following autumn quarter. Selection for acceptance into the program, which begins autumn quarter, is made by early May, and all applicants are notified of the admission committee's decision shortly thereafter. Because each application is valid only once, a student whose application for admission is denied must reapply if consideration is desired in any subsequent year.

Major Requirements

91 credits as follows:

- * *Foundation Courses (69 credits)*: ARCH 320, ARCH 321, ARCH 322; CM 310, CM 312, CM 313, CM 321, CM 322, CM 323, CM 331, CM 332, CM 333, CM 334, CM 410, CM 411, CM 412, CM 421, CM 423, CM 432, and CM 433,
- * *Construction/Construction Science Electives (6 credits)*: Two of the following: CM 415, CM 420, CM 425 or ARCH 420
- * *Business Electives (12 credits)*: Upper division real estate or business courses offered by the College of Architecture and Urban Planning or by the School of Business. (CM 413 recommended.)
- * *Capstone Experience (4 credits)*: CM 431
- * *Additional Degree Requirement*: A minimum of 2.5 cumulative GPA in upper-division college courses.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes*: The study of construction management requires an interdisciplinary curriculum that contains a mix of technical, managerial, and business courses to provide graduates with the essential skills needed to be successful in the construction industry. Oral and written communication skills are strengthened through written requirements and oral presentations. Construction management skill sets include the ability to read and interpret construction contract documents; the ability to determine appropriate methods for project construction and the proper sequence for each associated construction task; the ability to estimate project costs and time requirements; the ability to evaluate project site safety hazards and take action to minimize the potential for accidents occurring; an understanding of the legal framework associated with contract construction; and the ability to manage the myriad activities associated with constructing a project. Graduates pursue careers with construction companies, design firms, public agencies, homebuilders, consulting firms, real estate developers, and construction material suppliers.
- * *Instructional and Research Facilities*: The Architecture-Urban Planning Library (located on the third floor of Gould Hall) houses construction management books and periodicals. Additional materials are located in the Engineering Library and the Foster Library (Business School). College resources include a 30-work-station computer laboratory on the second floor of Gould Hall. Departmental resources include a student lounge in Room 242, Gould Hall. The lounge contains four computers and space for student collaboration.
- * *Honors Options Available*: None offered.
- * *Research, Internships, and Service Learning*: An internship is required for completion of the degree program. Every student is encouraged to seek summer employment in the construction industry, to provide a taste of real-world experience and an opportunity to work for a construction firm. While the department seeks to identify opportunities for internship positions, the responsibility for securing a position rests with each student.
- * *Department Scholarships*: None offered.

* *Student Organizations/Associations:*

- o Sigma Lambda Chi is a national student honor society for recognition of outstanding students majoring in construction management. Membership is offered only to those students who are in the top twentieth percentile of their class. Each year the student chapter conducts community service activities.
- o Associated Students in Construction (ASIC) is an umbrella organization for several student chapters of national organizations: Associated General Contractors of America, National Association of Home Builders, and Mechanical Contractors of America. Activities include professional guest lectures, field trips, attendance at professional meetings and seminars, and community service.

Of Special Note:

Dual-Degree Program: The Department of Construction Management, in conjunction with the Department of Architecture, offers a five-year dual-degree program to provide students education in both the design and construction disciplines. Students must consult an adviser and apply to the Department of Architecture upon completion of their Architecture program prerequisites. To be admitted to the Construction Management program, students apply at the beginning of the spring quarter of the first year in the Architecture program. The five-year curriculum is a blending of the Architecture and Construction Management programs. Graduates of the dual-degree program receive both a Bachelor of Science in Construction Management and a Bachelor of Arts in Architectural Studies. Students interested in the dual-degree program are encouraged to consult undergraduate advisers in both departments.

Graduate Program

Graduate Program Coordinator
116 Architecture Hall, Box 351610
206-685-4440

Master of Science in Construction Management

Admission Requirements

- * Baccalaureate degree (B.S. or B.A.) in civil engineering, construction management, building technology, architecture, or similar field from an accredited college or university in the United States, or its equivalent from a foreign institution. Students with undergraduate degrees in an area other than construction management or building technology must demonstrate an understanding of estimating, project planning and control, and project management either by transcript, validation examination, or successful completion of the following courses: CM 410 (5); CM 411 (3); CM 421 (3); CM 422 (2).
- * Minimum GPA of 3.00, based on the last 60 graded semester hours or last 90 graded quarter hours of undergraduate and graduate study.
- * Graduate Record Examination (GRE) scores
- * Statement of goals and objectives
- * Letters of recommendation
- * International applicants whose first language is not English must submit a valid Test of English as a Foreign Language (TOEFL) or Michigan Language Test (MLT) score. A minimum score of 580 (TOEFL) or 237 (TOEFLC), or 90 on the MLT, is required for admission.

Degree Requirements

45 credits, as follows:

- * *Core courses (15 credits):* CM 500 (3), CM 510 (3), CM 515 (3), CM 520 (3), CM 525 (3)
- * *Elective courses (21 or 24 credits):* 21 to 24 credits of the following: CM 505 (3), CM 545 (3), CM 550 (3), CM 555 (3), CM 565 (3), CM 570 (3), CM 593 (3), CEE 598, B E 551 (3), B E 552 (3), B E 553 (3), or other graduate-levels courses approved by adviser
- * *Thesis or project (6 or 9 credits):* Project -- CM 600 (6), or thesis -- CM 700 (9)

Course Descriptions

See page 263.

Landscape Architecture

348 Gould

Landscape architecture is a professional design discipline that addresses both the built and natural environments. It focuses on the design, analysis, and planning of outdoor spaces across a wide range of scales, with the intent of creating places that are both meaningful and functional. Landscape architects design everything from infrastructure elements, such as roadways, drainage systems, and parks, to prominent cultural monuments and gardens for public and private housing units. The education of a landscape architect includes aesthetic design skills, the development of social and environmental ethics, technical design skills, knowledge of a wide range of natural processes, an awareness of design history, and skills for working with other people. At the University of Washington, the focus is on urban ecological design education, which allows students to make a difference in the future of cities and urban regions all over the world.

Undergraduate Program

Adviser
348 Gould, Box 355734
206-543-9240, 206-685-4006

The Department of Landscape Architecture offers the following programs of study:

- * The Bachelor of Landscape Architecture (B.L.A) degree
- * A minor in landscape architecture

Bachelor of Landscape Architecture

Department Admission Requirements

1. Completion of 90 credits to include the following:
 - * Departmental Pre-professional Requirements: L ARCH 300* (usually offered autumn and summer quarters). One of the following courses (two recommended): L ARCH 352*, L ARCH 353*, L ARCH 450/L ARCH 451*. A drawing or painting course in art is also recommended. (*Transfer students: These courses are offered through UW Extension.)
 - * General Education Requirements: Skills Requirements: English Composition, 5 credits; Areas of Knowledge: Visual, Literary, & Performing Arts (20 credits); Individuals and Societies (20 credits); Natural World (20 credits to include ESS 101 and BIOL 113); W courses (10 credits, may also count toward any other requirement except the 5-credit English composition requirement).
 - * Electives to bring the total to 90 credits.
2. Undergraduate students currently enrolled at the UW may apply for admission to the department after completion of a minimum of 60 general education credits. Major status is normally granted upon completion of 90 credits and requires formal application and admission to the department.
3. Admission to the BLA program is competitive. Completion of the above requirements does not guarantee admission. Admission is based on academic record, a portfolio of creative work, three letters of recommendation, and other application materials. Contact the department for application materials and detailed information on admission, prerequisites, and required course work.
4. Application Deadline: February 15 for the following autumn quarter. Students are not admitted to the program at other times. Applications must include the BLA application forms. Students should apply during their second year with the expectation that they will have completed six quarters of General Education requirements by autumn quarter.

Major Requirements

Minimum 135 credits

- * *Studio Classes:* L ARCH 301, L ARCH 302, L ARCH 303, L ARCH 402, L ARCH 403, L ARCH 474, L ARCH 475, L ARCH 406, L ARCH 476
- * *History:* L ARCH 352 and L ARCH 353; and one course of environmental history
- * *Theory:* L ARCH 322, L ARCH 341, L ARCH 361, L ARCH 362, L ARCH 363
- * *Graphics:* L ARCH 411, L ARCH 412
- * *Professional Practice:* L ARCH 473
- * *Construction:* L ARCH 331, L ARCH 332, L ARCH 433
- * *Directed Electives* in computer, urban design and planning, ecology,

environmental legislation, environmental geology, soils, environmental horticulture, forest resources, and plant identification courses to bring the minimum total for the major to 135 credits.

Minor

Minor Requirements: Minimum 25 credits, including 6 studio credits (L ARCH 300); 6 landscape architecture history credits, chosen from L ARCH 352, L ARCH 353, L ARCH 450, L ARCH 451, L ARCH 498; 3 credits in theory and practice, chosen from L ARCH 322, L ARCH 341, L ARCH 361, L ARCH 362, L ARCH 462; 5 credits in any L ARCH or EHUF prefixed courses, including all L ARCH summer offerings and up to 6 credits of L ARCH foreign study courses; 5 credits of courses with the prefix ARCH, CM, or URBDP. Minimum GPA of 2.00 in courses counted toward minor.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The B.L.A. program provides a professional, accredited degree which enables graduates to practice successfully in design firms, nonprofit organizations, and public agencies. Building from a liberal arts foundation, the B.L.A. program focuses on developing design knowledge, skills, and abilities through a series of nine environmental- and community-based design studios.

The goals of the program are to provide students with a broad academic and professional exposure to landscape architecture and design so that their creative potential and professional growth are realized, and so that they may become leaders in the field. The education includes learning to conceptualize and design through practice on studio projects, fostering creativity, developing graphic and verbal communication skills, facilitating cognitive abilities, and developing applicable computer skills in the design process. Studios use individual, team-oriented, and interdisciplinary projects to develop strong interactive and evaluative skills. Studio education applies knowledge gained in lecture courses which include historic and contemporary concepts in landscape architecture, design theory, site planning, construction, and communications, as well as elective courses in allied disciplines. The studio sequence addresses projects from detailed to regional scales, rural and urban contexts, and diverse cultures.

- * *Instructional and Research Facilities:* The five-year, 225-credit degree is structured around nine studios augmented by lecture courses. The program includes some opportunities for independent studies and work in professional settings. Departmental courses are complimented by elective courses from other departments, including architecture, urban horticulture, soils, geology, urban design and planning, botany, and ecology.

Landscape architecture studios are led by departmental faculty or members of the professional community. Several studios are taught jointly with faculty from other disciplines. Studios address specific areas of inquiry including basic design principles and processes, planting design, materials and craftsmanship, landscape planning for parks or natural areas, neighborhood and housing design, urban landscape design, ecological restoration, and design for ethnic cultures. A capstone pair of studios requires students to integrate their experience of design theory, practice, and construction in a resolved design and set of construction drawings.

- * *Honors Options Available:* None offered.
- * *Research, Internships, and Service Learning:* Departmental lecture courses address the functioning of natural systems, site planning issues, computer applications, and cultural and sociological forces that influence the profession's work. Students are encouraged to gain real-world experience through professional experience "practica" with professional firms, organizations, or agencies.

Students enter the three-year program in the department following completion of departmental prerequisites and two years of University requirements. In addition to required course work, the program encourages students to pursue personal interests through directed and independent study within and beyond the department.

- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* None.

Graduate Program

Graduate Program Coordinator
448 Gould Hall, Box 355734
206-543-2564, 206-616-3582
cauplarc@u.washington.edu

Master of Landscape Architecture

The Master of Landscape Architecture program, accredited by the American Society of Landscape Architects, is a professional program that offers training in design and inquiry. The design studios form the core of this program, which is supported by rigorous independent investigation in seminars and in a thesis project. Students are expected to develop a specialty within the discipline, under the professional guidance of the faculty. The curriculum emphasizes the following:

- * *Urban Ecology.* The rapidly changing environment of the Pacific Northwest offers an excellent opportunity for courses and thesis projects to explore the connections between culture and nature and to test ideas for how social and spatial conflicts between development and conservation might be addressed. The faculty are particularly interested in the changing roles of familiar urban and suburban landscapes, as these areas are increasingly expected to function as part of an ecological infrastructure. At the same time, diverse human cultural communities have developed with differing perceptions of and values for these changing landscapes. This department offers students the opportunity to study the rich cultural resources of these human communities as they develop new relationships to their environments, and to participate in this overlap between natural and cultural processes. The department currently offers students exposure to the social, cultural, and natural environment of central Mexico as an international example of community development and design.
- * *Design Leadership.* The faculty is committed to training students to be leaders in design practice and education. This includes the education of both children and adults to understand the consequences of human transactions with the natural environment. Courses are offered and research is being conducted on designing outdoor educational environments. Graduate students are also encouraged to develop independent leadership skills which will provide them with self-confidence and adaptability in a rapidly changing professional world. The primary areas in which students are encouraged to develop leadership abilities are in the definition and practice of design as a basis for interdisciplinary work, environmental education and the application of ecological concepts to urban design, the use of communication technology to develop creative solutions to cultural and environmental conflicts, and international design-build projects in which students confront the global nature of contemporary development issues.

The graduate program considers applicants with and without previous design education, and encourages applications from persons with diverse academic and professional backgrounds. The faculty is experienced in teaching mature students and seeks to admit students with a range of ages, backgrounds, and interests. Students are encouraged to benefit from the location of the department within a broad and excellent research university by adding elective courses in other disciplines to their core curriculum. In addition, graduate students may elect to participate in College-wide certificate programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

Program Requirements

Specific program requirements are arranged to fit each student's individual background. Seminar and field courses are selected to help students achieve their educational goals and develop a credible specialty area within landscape architecture. Students with a previous degree in landscape architecture begin course work with the Required Graduate Curriculum studios, while students from other educational backgrounds begin with the Basic Core design studios. The Required Graduate Curriculum sets the academic work required for the degree at 72 approved credits. In addition, a specialization must be developed in the area of a student's individual interests, which is worth 12 credits. This encourages students to deepen their knowledge in a particular area, while maintaining substantial flexibility for each individual.

A thesis is required of all master's students. This independent project is advised by a committee of faculty, but allows the student to develop greater intellectual maturity and satisfaction by pursuing a topic she or he has selected out of personal interest. The thesis also allows students to

demonstrate a professional level of mastery of a specialized subject area. Students complete either a written and graphic product or a purely written product for the thesis, depending on the thesis model they choose to follow. Four models are available: the professional project thesis, the design critique thesis, the research thesis, and the design thesis. Students make choices about the type of thesis and the methods they will use in conjunction with their faculty adviser and committee members.

Admission Requirements

Candidates applying to the Master of Landscape Architecture program must apply both to the Graduate Admissions Office and to the Department of Landscape Architecture by January 15 to be considered for admission the following autumn quarter.

Admission to the Graduate School requires (1) a baccalaureate degree from an accredited U.S. college or university, or its equivalent in a foreign institution; (2) a GPA of 3.00 or higher in the last 90 graded quarter hours or the last 60 graded semester hours; and (3) a Graduate Record Examination (GRE) score taken within the past three years.

Admission to the Master of Landscape Architecture program is a competitive process with priority given to applicants whose abilities, as determined by the department's admissions committee, will enable them to complete the program expeditiously and with a high level of achievement. Please contact the department for additional information.

Course Descriptions

See page 265.

Urban Design and Planning

410 Gould

Urban design and planning deals with critical issues of human settlement and urban development. It provides communities with an informed basis for coordinated public- and private-sector action. Urban design and planning constitutes a professional field of growing complexity, responding to the urban complexities of this century. The Department of Urban Design and Planning fosters an integrative approach to education and research in planning the physical environment. The academic program includes the social, behavioral, and cultural relationships between people and the form and quality of their built and natural environment; the financial, administrative, political, and participatory dimensions of planning, design, and development; and the informational base for making deliberate decisions to shape urban areas and regions, bringing analysis together with vision.

Departmental faculty are active participants in interdisciplinary research units of the College of Architecture and Urban Planning, including the Center for Community Development and Real Estate and the Institute for Hazard Mitigation Planning and Research. Faculty also participate in the Puget Sound Regional Synthesis Model (PRISM) University Initiative Fund program. The department also administers the Remote Sensing Applications Laboratory, concerned with applications in urban planning of remote sensing and geographic information systems (GIS) technology and the Urban Ecology Research Laboratory. In addition, the College has a wide array of facilities for computer-based instruction related to design, including CAD, GIS, and visualization technology, and runs a joint program in advanced computer technology and virtual reality with the Human Interface Technology Laboratory of the Washington Technology Center.

Undergraduate Program

Urban Design and Planning offers the following programs of study:

- * A minor in urban design and planning

Minor

Minor Requirements: 30 credits to include URBDP 300 (5 credits); 3 credits chosen from URBDP 460, URBDP 461, or URBDP 471; minimum 10 additional credits in URBDP-prefix courses; and 12 additional credits in planning-related courses with Urban Design and Planning adviser approval. A 2.0 minimum grade is required for each course counted toward the minor. See departmental adviser for recommended courses.

Graduate Program

Graduate Program Coordinator
410 Gould, Box 355740
206-543-4190

The department offers the Master of Urban Planning (M.U.P.) degree and its faculty participate in the interdisciplinary Doctor of Philosophy (Ph.D.) in Urban Design and Planning. The M.U.P. is the professional degree, while the Ph.D. is primarily for students planning to enter research and teaching positions in urban planning and design.

The graduate program focuses on planning the physical environment and its socioeconomic and political determinants. Advanced students are encouraged to conduct research and studies in one of the following specializations:

- * urban design dealing with physical form, character, and quality issues
- * community development and real estate including public/private development processes
- * preservation planning and design
- * land-use planning, including its environmental, socioeconomic, legal, information systems, and administrative aspects.

Graduate students may elect to participate in the College-wide Certificate Programs in Urban Design, and Preservation Planning and Design. See program descriptions in the preceding College section.

Master of Urban Planning

The Master of Urban Planning degree is the usual educational qualification for professional practice of city and regional planning, including generalist planning, research, urban design, and administrative positions in a wide variety of public agencies and private consulting firms. It is a two-year, or six-quarter, program requiring a minimum of 72 credits.

Requirements for graduate-level study include a satisfactory academic record and undergraduate training in one of a variety of disciplines, including urban planning and environmental design or in other appropriate fields, such as geography, economics, or other social sciences; English and other humanities; civil engineering and environmental studies; or architecture and landscape architecture. Students planning to enter the program should have completed at least one college-level course in each of the following areas: economics, mathematics, statistics, American government, environmental systems, and cultural diversity. Students without sufficient background must take these prerequisite courses concurrently with their graduate studies.

The primary objective is to educate professional planners with a broad range of competence in planning and design; a second objective is to provide opportunities for individual studies in selected professional areas. Core course requirements include 32 credits covering the history and theory of planning and urban design, urban form, communication methods, quantitative methods, processes and methods of land use planning, planning law, research methods, and a planning studio. Also required are 17 credits of restricted electives, including a course in advanced methods and a second studio; both may be in an area of specialization. In addition, a course in land-use planning, in urban development economics, and in history/theory of planning is required. A 9-credit thesis or professional project is required upon completion of all other degree course work. Of the 72 minimum credits required for the degree, 14 credits may be in open electives.

The core provides a foundation in urban design and planning for all students. An internship is encouraged for those without previous professional experience. A specialization in one area of planning is required. Six major specialized areas offered in the department include land-use planning and growth management, community development and real estate, urban design, preservation planning, environmental planning, and transportation planning.

Students are admitted to the M.U.P. program primarily in autumn quarter and all application material should be received by the department no later than the preceding February 1 (November 1 for international applicants). Graduate Record Examination general test scores, three letters of recommendation, transcripts of previous degree programs and any additional academic study, and a statement of purpose are required. TOEFL is required for international applicants.

Doctor of Philosophy

Some of the departmental faculty are part of an interdisciplinary faculty group which offers doctoral study in urban design and planning. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of the catalog.

Course Descriptions

See page 267.

College of Arts and Sciences

Dean

David C. Hodge
50 Communications

Divisional Deans

Gary D. Christian -- Natural Sciences
Michael R. Halleran -- Arts and Humanities
Susan Jeffords -- Social Sciences
Julie K. Stein -- Computing, Facilities, and Research

The departments and schools of the College of Arts and Sciences offer nearly 100 curricula leading to the degrees of Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Music, or Bachelor of Science, as well as graduate study leading to master's and doctoral degrees.

Undergraduate Study

Graduation Requirements

A liberal arts education entails mastery of certain basic skills, exposure to a broad range of academic disciplines, and concentration in a particular field of knowledge. To be awarded a baccalaureate degree a student in the College must fulfill requirements in the following areas: Language Skills, Reasoning and Writing in Context, Areas of Knowledge, and a Major (see table below). All required courses must be taken for a numerical grade. In addition, the student must present at least 90 credits outside the major department and must meet minimum GPA requirements as specified below. Detailed information on graduation requirements is provided in the Bachelor's Degree Planbook, available from the Undergraduate Advising Center, 171 Mary Gates Hall.

Requirement*	Credits	
Language Skills	5-20	* English composition (5 credits) * Foreign language (0-15 credits, depending on placement)
Reasoning and Writing in Context	15	* Quantitative and Symbolic Reasoning (5 credits) * Additional writing courses (10 credits)
Areas of Knowledge	75	General-education courses to include at least 20 credits in each of the following areas: * Visual, Literary, and Performing Arts (VLPA) * Individuals and Societies (I&S) * Natural World (NW)
Major	50-90	An area of specialization, usually in a single department
Minor (optional)	25-35	An additional area of specialization
Electives	varies	Free choice; as many credits as necessary to bring total to 180

*Requirements of colleges other than Arts and Sciences are based on these, but may differ. Students who have not chosen a major are advised to follow the College of Arts and Sciences requirements.

Language Skills

To receive a degree from the College of Arts and Sciences, students whose first enrollment in college (whether at the UW or elsewhere) was in autumn quarter 1985 or later are required to complete 5 credits of English composition with a minimum grade of 2.0. They must also complete course work through the end of the first-year college sequence in a foreign language, with at least a 2.0 in the third-quarter course, or demonstrate equivalent proficiency by passing an examination or by receiving a passing grade in a qualifying course beyond the first-year level. Credits used for these two requirements (including the entire first year of foreign language, if taken) cannot also be applied to the Areas of Knowledge requirements described below.

Reasoning and Writing in Context

Students who first entered college autumn quarter 1985 or later must complete a minimum of 5 credits in Quantitative or Symbolic Reasoning (Q/SR) and 10 credits of additional composition courses or courses that emphasize the development of writing skills in the context of an academic discipline (W courses). Q/SR and writing courses, if they apply, can also be counted toward Areas of Knowledge or major requirements. The writing requirement is in addition to the English composition requirement mentioned in the preceding paragraph.

Areas of Knowledge

The Areas of Knowledge requirement is the means by which the student develops a breadth of knowledge. Undergraduate courses are currently divided broadly into three categories: Visual, Literary, & Performing Arts; Individuals & Societies; and the Natural World. Each student must select at least 20 credits in courses from each of the three fields and an additional 15 credits from any courses in the three fields. Of the 75 total credits required, 15 may be from courses in the student's major department.

Course Designators

The following symbols, included in course descriptions in this catalog, indicate which, if any, of the above requirements are fulfilled by certain courses:

- * VLPA -- Visual, Literary, and Performing Arts (Area of Knowledge requirement)
- * I&S -- Individuals and Societies (Area of Knowledge requirement)
 - * NW -- The Natural World (Area of Knowledge requirement)
 - * QSR -- Quantitative and Symbolic Reasoning

Courses that meet the foreign-language requirement and the additional-writing requirement are not marked. The third-quarter (or second-semester) course in any language meets the language requirement, so long as the entire first-year sequence totals at least 12 credits (regardless of whether the student earned credit for the earlier parts of the sequence). Consult the quarterly Time Schedule for writing-intensive courses that meet the additional-writing requirement.

Major

In fulfilling the requirements for a major, the student engages in thorough study of a discipline or subject, aimed at developing knowledge in depth. This part of the student's program is determined by the department, school, or faculty committee with which the major study is pursued. Measured in academic credits, the "major" required of each student consists of 50 or more prescribed credits in a department of the College or a closely related group of departments. Descriptions of major programs are printed below.

Minor

Completion of a minor, available through many departments, is optional. Requirements are shown under individual department undergraduate programs, below, or in a minors handout available in the Undergraduate Advising Center, 171 Mary Gates Hall. Minors granted by the College of Arts and Sciences are not necessarily or even usually the same as the minors approved by the College of Education for teaching at the secondary level.

Credits Required Outside Major Department

So that the student will not overspecialize, the College limits to 90 the number of credits from a single department that the student may elect to count in the 180 credits required for the baccalaureate degree. A department itself can require no more than 70 credits from courses within the department, and no more than 90 credits from within the department and related fields combined, as constituting its major program for the baccalaureate degree. Exceptions to these restrictions may be granted by the Dean.

GPA Required for Graduation

To be eligible to receive the baccalaureate degree, the student must achieve at least a 2.00 cumulative GPA in the major (some departments prescribe a higher minimum GPA for the major), as well as a 2.00 cumulative GPA for all work done in residence at the University.

Applying for Graduation

Students should apply for the baccalaureate degree no later than the first quarter of their final year. Seniors who apply by announced quarterly deadlines will receive Graduating Senior Registration Priority (GSP), allowing them to register first for the following quarter. GSP status is limited to two quarters.

All students may graduate under the College requirements published in this catalog. Students may use the department requirements in effect at the time they are admitted to the major, if they graduate within 10 years of that time. Otherwise, the department may insist on more recent major requirements. Students wishing to fulfill a previous set of requirements should see an adviser for details and options. All responsibility for fulfilling graduation requirements rests with the student concerned.

Limits on Physical Education and ROTC Courses Allowed Toward Graduation

A student graduating from the College of Arts and Sciences may count a maximum of three credits of 100-level physical-education activity courses taken at the University of Washington, or their equivalents at other collegiate institutions, as elective credits toward graduation. At present, physical-education courses are not offered at the University. Up to 18 credits in upper-division ROTC courses also may be counted as elective credits toward graduation, but no lower-division ROTC credits may be counted.

Graduate Study

Students who intend to work toward advanced degrees must apply for admission to the Graduate School and must meet the general requirements outlined in the graduate and professional volume of the General Catalog, as well as the requirements established by the graduate faculty in the department or unit offering the degree program. Graduate students must satisfy the requirements for an advanced degree that are in force at the time the degree is to be awarded.

American Ethnic Studies

B510 Padelford

American Ethnic Studies exposes students to key content, methodologies, and theories in the comparative and interdisciplinary study of African Americans, Asian/Pacific Americans, and Chicanos in the United States.

Undergraduate Program

Adviser
B509 Padelford, Box 354380
206-543-5403

The Department of American Ethnic Studies offers the following undergraduate program:

- * The Bachelor of Arts degree with a major in American ethnic studies
- * A minor in diversity

Bachelor of Arts

Suggested First- and Second-Year College Courses: United States history, literature, drama, arts, sociology, political science, ethnic studies.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

60 credits as follows:

1. *Core courses (35 credits):*
 - * 15 credits of AES 150, AES 151, AES 212
 - * 10 credits (two courses) from AFRAM 101, AIS 201 or AIS 203, AAS 101, CHSTU 101, to include one in the concentration and one outside the concentration; (for Comparative American Ethnic Studies concentration, choose any two)
 - * 10 credits (5 credits each) of AES 495 and AES 496
2. *Concentration: 25 credits* in one of the following: African American Studies, Asian/Pacific American Studies, Chicano Studies, Comparative American Ethnic Studies. See department for list of concentration courses.

Minor

Diversity minor requirements: 25 credits to include the following:

- * One foundation course (5 credits) chosen from the following: AES 151, ANTH 330, HSTAA 105, LSJ/CHID 332, PSYCH 250, WOMEN 200
- * A minimum of four additional courses, with at least one each from four of the five following categories (20 credits): arts/cultural; historical; global; contemporary/institutional; applications. A list of courses by category is available at <http://depts.washington.edu/divminor/>.
- * Minimum 15 credits must be completed in residence at the UW. Maximum 10 credits from one department and maximum 10 credits from the student's major department may be applied toward the minor.

Diversity minor students are strongly encouraged to complete an internship, volunteer project, research project, study abroad program, intergroup dialogue course, or some applied learning opportunity that promotes the goals of the minor.

Contact information for the minor is as follows: Address: B505 Padelford, Box 354380; Phone: 206-616-5789; Email: divminor@u.washington.edu. Program director is Professor Rick Bonus at rbonus@u.washington.edu.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The American Ethnic Studies curriculum prepares undergraduate students to understand the breadth, key content, methodologies, and theories in the field of ethnic students as well as comparative interdisciplinary knowledge of African American, Asian/Pacific American, and Chicano issues. The major is designed to help students acquire the skills to think and write critically about race, class, and ethnicity in social and historical contexts and multiple categories of social diversity.
- * *Instructional and Research Facilities:* Writing Center
- * *Honors Options Available:* None
- * *Research, Internships, and Service Learning:* Students have the opportunity to become actively engaged in personalized research and discovery through independent study and research courses in each program concentration.
- * *Department Scholarships:* None
- * *Student Organizations/Associations:* Ethnic Studies Student Association

Course Descriptions

See page 271.

American Indian Studies

C514 Padelford

American Indian studies surveys Indian cultural developments in art, music, history, medicine, media and film, language, and literature and offers performance and studio experience.

Undergraduate Program

Adviser
C514 Padelford, Box 354305
206-543-9082

The American Indian Studies Center offers the following undergraduate programs:

- * Bachelor of Arts through the General Studies program
- * A minor in American Indian studies.

Bachelor of Arts

Suggested First- and Second-Year College Courses: AIS 201, AIS 202, AIS 203

Department Admission Requirements

See General Studies adviser for details.

Major Requirements

A major emphasizing American Indian Studies is available through the General Studies program. All AIS courses may count toward that major. No more than 6 credits of any combination of AIS 253 and AIS 350 may be counted toward the major.

Minor

Minor Requirements: Minimum 30 credits to include:

- * 10 credits of introductory coursework in American Indian studies, chosen from AIS 102, AIS 201, AIS 202, AIS 203. Other courses may be allowed with the approval of the American Indian Studies program chair.
- * 20 credits of AIS electives, chosen from AIS courses or from a select list of courses in other departments (see program adviser or program website for complete list).

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* American Indian studies graduates possess a broad knowledge of historical and contemporary American Indian cultures, have the ability to develop both written and oral arguments, possess knowledge of American Indian philosophy and world view, and possess an understanding of Native Nation sovereign status and treaty status.
- * *Instructional and Research Facilities:* None
- * *Honors Options Available:* None offered
- * *Research, Internships, and Service Learning:* None offered
- * *Department Scholarships:* None offered
- * *Student Organizations/Associations:*
 - o American Indians in Science and Engineering Society (AISES), UW Chapter Office: Ethnic Cultural Center and 207 Loew Hall (MSEP), 206-543-5536 or 685-8688
 - o First Nations at the UW, Office: Ethnic Cultural Center, American Indian Room, 206-543-4635, ext. 12
 - o Medicine Wheel Society, Office: Ethnic Cultural Center and School of Medicine

Course Descriptions

See page 274.

Anthropology

M32 Denny

Anthropology is the study of human beings in all their cultural diversity. It includes the study of human evolution, the archaeological record, language and culture, the relationship between humans and their environment, and cultural modes of being as these differ in time and space. In studying anthropology, students can better understand how to find ways to live together in today's world, respecting cultural diversity while building upon common human values.

The study of anthropology at the University of Washington is comprised of three sub-disciplines:

- * Archaeology is the study of the human past through investigation of material remains (artifacts, food remains, features, structures, etc.) and their relationships in space and time.
- * Biocultural anthropology focuses on understanding human variation through the study of the ecological, demographic, genetic, developmental, and epidemiological dimensions of modern human adaptation and its evolutionary basis.
- * Sociocultural anthropology is the study of human societies from the perspective of culture as a comparative frame.

Undergraduate Program

Adviser

243 Denny, Box 353100

206-543-7772 The Department of Anthropology offers the following undergraduate programs:

- * The Bachelor of Arts degree with a major in anthropology
- * A minor in anthropology

Bachelor of Arts

Suggested First- and Second-Year College Courses: Any two of the following: ANTH 202, ANTH 203, ANTH 204, ANTH 206, ANTH 207, ANTH 208, ANTH 209, ANTH 210, or ANTH 228; ARCHY 205; BIO A 201; at least one from STAT 220, STAT 311, or Q SCI 381.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

55 credits as follows:

1. Core courses (20 credits): ARCHY 205, BIO A 201; any 200-level ANTH course; and one of the following: SOC 220, STAT 220, STAT 311, Q SCI 381
2. 35 additional ANTH, ARCHY, and BIO A credits distributed across the subfields or concentrated as suits the interests of the student. 20 of these credits must be in upper-division (300- or 400-level) courses. Students may count one 100-level ANTH, ARCHY, or BIO A course toward the major, but are not required to do so.
 - * The following AIS courses may apply toward this requirement: AIS 201, AIS 202, AIS 203, AIS 240, AIS 311, AIS 312, AIS 316, AIS 317, AIS 330, AIS 335, AIS 340, AIS 443.
 - * Maximum 12 credits from ANTH 499, ARCHY 499, and BIO A 499 combined can be counted toward the major.
3. Additional major requirements:
 - * Courses with a grade of 1.9 or lower do not count toward the major.
 - * At least 25 credits in the major must be completed with a minimum grade of 3.0.
 - * Transfer students must complete a minimum of 15 upper-division credits in anthropology at the UW.

Minor

Minor Requirements: 30 credits (at least 15 credits at upper-division level) from courses with the following prefixes: ANTH, ARCHY, BIO A. ANTH 100 may be applied to the minor but is not required. (Certain AIS courses may apply toward this requirement. See departmental adviser for list.) Minimum grade of 2.0 required in each course.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The study of anthropology develops skills in critical thinking, research, and writing, as well as technical skills specific to the different subfields (ethnographic field techniques, interpretation of data, statistical analysis, archaeological methods of data collection and interpretation). An undergraduate degree prepares students for many positions that involve working with people, as well as for academic studies in a variety of fields. Careers in anthropology can be developed through employment with government agencies, museums, teaching and research, private consulting firms, and nongovernmental organizations.
- * *Instructional and Research Facilities:* Undergraduate students have access to the following facilities for classroom training in laboratory methods and for research experiences subject to faculty approval and supervision: the Burke Museum (ethnological, archaeological, natural history, and archival collection), Quaternary Research Center, Biodemography Lab, Luminescence Dating Laboratory, Electron Microscope Laboratory Cooperative, Geoarchaeology Lab, Digital Imaging and Microscopy Lab, Geographical Information System (GIS) Computer Lab. In addition, the department co-sponsors with the Department of Geography a writing center offering undergraduate writing support for anthropology classes.
- * *Honors Options Available:* With College Honors. With Departmental Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* The Department of Anthropology supports students who undertake community-based internships under faculty supervision.

* *Department Scholarships:*

- o The Brett E Baldwin Scholarship, for approximately \$800, is awarded to an outstanding graduate or undergraduate majoring in anthropology.
- o The Wienker Prize for Best Undergraduate Essay. Four awards are given each year, one in each subdiscipline for the best essay in an undergraduate anthropology class, and one for the best senior honors thesis.

* *Student Organizations/Associations:* The Anthropology Club is run by and for students in the department.

Of Special Note:

ANTH 100, BIO A 100, and ARCHY 105 count as Areas of Knowledge and not as part of the anthropology major.

Graduate Program

Graduate Program Coordinator
M31 Denny Hall, Box 353100
206-685-1562

The department recognizes four principal subfields of anthropology within its faculty, programs, and curriculum: archaeology, biocultural anthropology, environmental anthropology, and sociocultural anthropology (including anthropological linguistics). The department offers four distinct Ph.D. programs within the subdisciplines. A Ph.D. program in sociocultural anthropology with emphasis in ethnomusicology is offered in cooperation with the School of Music. The M.A. degree may be earned within the Ph.D. programs. Graduate students are admitted to, and specialize in, their chosen subfields from the beginning of their graduate studies.

Admission Requirements

Applicants are admitted to begin study only during autumn quarter and are advised to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School Application, official transcripts, the Supplementary Information Form, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE). International students are required to take the TOEFL exam as well as the GRE.

Program Requirements

For each of the respective graduate programs, completion of the core requirements and a reading knowledge of one foreign language are required. Under the guidance of a supervisory committee selected from the appropriate subfield, the student shapes an individual program. The major areas emphasized in the faculty and curriculum are the United States, Mexico, Africa, South Asia, Southeast Asia, China, Oceania, and the post-Soviet states. The M.A. degree usually requires two years of graduate study; the Ph.D. programs usually require at least three years beyond the master's level, including a year of independent field research and a year to organize field materials and write a doctoral dissertation.

Financial Aid

Two to four three-year fellowships are awarded to outstanding entering students. A limited number of teaching and research assistantships and hourly positions are offered primarily to advanced students. Some students may be qualified for a few Foreign Language Area Studies Fellowships. Work-study positions may also be available for eligible graduate students.

Course Descriptions

See page 275.

Applied and Computational Mathematical Sciences

C36 Padelford

Mathematics is the common language of modern science, engineering, and business. Techniques of mathematical modeling and data analysis are key instruments in the tool kit of modern practitioners and researchers in a wide array of disciplines. ACMS is an interdisciplinary program in the mathematical sciences that provides a sound training in mathematical modeling, scientific computation, mathematical reasoning, and statistical analysis. The program is jointly administered by the Departments of Applied Mathematics, Computer Science and Engineering, Mathematics, and Statistics, offering students access to their combined resources. An ACMS major is an excellent stepping stone to a career in engineering and the physical, life, and management sciences.

Undergraduate Program

Adviser
C36 Padelford, Box 354350
206-543-6830
advising@math.washington.edu

The ACMS program offers a Bachelor of Science degree that builds on the strengths of the four mathematical sciences departments as well the many quantitatively oriented departments across campus. All students complete a core set of courses developing basic skills in modeling, computation, mathematics, and statistics. Students choose one of the eight option areas listed below for further training and specialization.

- * *Biological and Life Sciences* focuses on basic techniques of mathematical modeling and computing that are employed in the life sciences.
- * *Discrete Mathematics and Algorithms* gives students a broad background in mathematics and computation with special emphasis on discrete mathematics and its application to optimization and algorithm design.
- * *Engineering and Physical Sciences:* This option is an excellent choice for students with an interest in the physical world and classical areas of applied mathematics.
- * *Mathematical Economics:* Students in this option obtain a firm foundation in applied and computational mathematics as well as a basic grounding in economic theory.
- * *Operations Research* provides a firm foundation in the mathematical tools of operations research, particularly optimization and stochastic modeling.
- * *Scientific Computing and Numerical Algorithms* focuses on the design, mathematical analysis, and efficient implementation of numerical algorithms for such problems.
- * *Social and Behavioral Sciences* provides a foundation in commonly used statistical and computational techniques followed by flexibility in pursuing different sets of advanced courses.
- * *Statistics:* This option is designed to introduce students to theory, methodology, and applications of statistics.

Bachelor of Science

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126, PHYS 121, PHYS 122, PHYS 123, CSE 142, CSE 143

Department Admission Requirements

Admission is competitive. A GPA of at least 2.50 in the following courses, with a minimum grade of 2.0 in each course: CSE 142, 143; MATH 124, MATH 125, MATH 126; MATH 307 or AMATH 351; MATH 308 or MATH 318; PHYS 121, PHYS 122, PHYS 123. MATH 134, MATH 135, MATH 136 may be substituted for MATH 124, MATH 125, MATH 126, MATH 307, and MATH 308. Certain options allow the substitution of other courses in place of the PHYS requirements. See adviser for details.

Major Requirements

90 credits as follows:

1. A minimum GPA of 2.50 for all courses counted toward the major; minimum grade of 2.0 in each course taken toward the major.
2. Core: 58 credits to include MATH 124, MATH 125, MATH 126; MATH 308 or MATH 318; MATH 307 or MATH 351; MATH/STAT 390; CSE 142, CSE

143; AMATH 352; AMATH/MATH 381, AMATH 383; PHYS 121, PHYS 122, PHYS 123. Certain options allow the substitution of other courses in place of the PHYS requirements. See an adviser for details.

3. Completion of one of the following options:
- Biological and Life Sciences Option.** 32 credits to include option core (12 credits): MATH 324, AMATH 353, AMATH 422, AMATH 423; and option electives (20 credits): outside area (12 credits or double major/double degree; see adviser for options) and 8 credits of approved courses at the 300 level or above, chosen from the four participating departments.
 - Discrete Mathematics and Algorithms Option.** 32 credits to include option core and electives. Option core: 18 credits for non-Computer Science and Engineering majors-MATH 310, MATH/STAT 394, CSE 373, CSE 410, CSE 417 and one of CSE 413, CSE 415; 9 credits for Computer Science/Computer Science and Engineering double major/double degree-MATH/STAT 394, CSE 421, CSE 431. Option electives: 14 credits for non-Computer Science and Engineering majors, 23 credits for Computer Science/Computer Science and Engineering double majors, to include 9 credits from MATH 407, MATH 408, MATH 409, MATH 461, MATH 462, and remaining credits from approved courses at the 300 level or above from the four participating departments.
 - Engineering and Physical Sciences Option.** 32 credits to include option core (15 credits): MATH 324, AMATH 401, AMATH 402, AMATH 403; and option electives (17 credits): outside area (11 credits or double major/double degree; see adviser for options) and 6 credits of approved courses at the 300 level or above, chosen from the four participating departments.
 - Mathematical Economics Option.** 32 credits to include option core and electives. Option core (12 credits): MATH 310, MATH 327, MATH 407; and at least one of the following: MATH 408, STAT 423. Option electives: Either (1) or (2), below. (1) 20 credits including at least 15 credits from ECON 301, ECON 400, ECON 401, ECON 404, ECON 421, ECON 422, ECON 454, ECON 472, ECON 482, ECON 483, ECON 485; at least 8 additional credits at the 300 level or above from the four participating departments or from the department of Economics (taken from ECON courses listed above). (2) Complete a double major with a Bachelor of Science in Economics.
 - Operations Research Option.** 32 credits to include option core and electives. Option core (15 credits): MATH 310, MATH/STAT 394, MATH/STAT 395; and at least two of the following: MATH 407, MATH 408, MATH 409. Option electives: Either (1) or (2), below. (1) 17 credits, including at least 6 credits from MATH/STAT 491, MATH/STAT 492, STAT 421, 423; at least 8 credits from OPMGT 301, OPMGT 402, OPMGT 443, OPMGT 450, OPMGT 490, QMETH 450, QMETH 490, IND E 237, IND E 324, IND E 325, IND E 326, IND E 421, IND E 424, IND E 426, IND E 430, IND E 433, (with at least one course at the 400 level); at least 3 additional credits at the 300 level or above from the four participating departments or from the departments of Management Science and Industrial Engineering (taken from IND E courses listed above). (2) Complete a double degree in Management Science in the School of Business Administration or in Industrial Engineering in the College of Engineering.
 - Scientific Computing and Numerical Algorithms Option.** 32 credits to include option core (15 credits): MATH 310, MATH 327, MATH 464, MATH 465, MATH 466; and option electives (17 credits), to include 11 credits from the following: AMATH 301; AMATH 353 or MATH 309; CSE 373 or CSE 326; CSE 410; AMATH 401, AMATH 402, AMATH 403; MATH 407, MATH 408, MATH 409; MATH 427, MATH 428, MATH 429; MATH 438, MATH 439; MATH 435, MATH 436; remaining credits from approved courses at the 300 level or above from the four participating departments.
 - Social and Behavioral Sciences Option.** 32 credits to include option core (10 credits): MATH/STAT 394, MATH/STAT 395, STAT 423; and option electives (22 credits): outside area (12 credits or double major/double degree; see adviser for options) and 10 credits of approved courses at the 300 level or above, chosen from the four participating departments.
 - Statistics Option.** 32 credits to include program core (22 credits): MATH/STAT 394, MATH/STAT 395, STAT 341, STAT 342, STAT 421, STAT 423; option electives (10 credits): approved courses at the 300 level or above, chosen from the four participating departments.

See adviser for additional information on program options, for possible substitutions, and for approval of elective choices noted above.

Student Outcomes and Opportunities

- * **Learning Objectives and Expected Outcomes:** The ACMS degree emphasizes the development of advanced skills in discrete and contiguous mathematical modeling, computing and scientific computa-

tion, mathematical reasoning and analytic skills, and statistical reasoning and analytic skills. Students develop an expertise at an advanced level in an applications area. This set of skills provides the basis for careers in a wide array of quantitative disciplines including engineering; the physical, life, and social sciences; as well as business and management sciences. In addition, the ACMS program has developed partnerships with a number of departments on campus to facilitate the pursuit of double majors.

* **Instructional and Research Facilities:** The program has access to the combined instructional and research facilities of the four participating departments, as well as the Mathematical Sciences Computing Center (MSCC), the Mathematics and Statistics library, and the Math Study Center.

* **Honors Options Available:** With College Honors. With Departmental Distinction. See adviser for details.

* **Research, Internships, and Service Learning:** The program is provided with internship opportunities periodically, which are then passed on to students.

* **Department Scholarships:** None offered.

* **Student Organizations/Associations:** MAA Student Chapter, Actuarial Club, SIAM

Applied Mathematics

408 Guggenheim

Applied mathematics is concerned with mathematical modeling and analysis of problems from the physical, biological, and social sciences, and from engineering.

Undergraduate Program

Adviser
412 Guggenheim, Box 352420
206-543-5493

The Department of Applied Mathematics offers the following undergraduate programs:

- * The Bachelor of Science degree in Applied and Computational Mathematics, offered in cooperation with departments of Computer Science and Engineering, Mathematics, and Statistics. See Applied and Computational Mathematical Sciences for specific degree information.
- * A minor in applied mathematics.

Minor

Minor Requirements: 27-28 credits as follows:

- MATH 124, MATH 125, MATH 126 (5, 5, 5) or equivalent
- AMATH 351, AMATH 352, AMATH 353 (3, 3, 3)
- One of the following courses: AMATH 301 (4), AMATH 383 (3), AMATH 401 (4), AMATH 402 (4), AMATH 403 (4), AMATH 422 (3), AMATH 423 (3), or AMATH 441 (3)
- Minimum grade of 2.0 required in each course

Graduate Program

Graduate Program Coordinator
408L Guggenheim, Box 352420
206-543-5077

The Department of Applied Mathematics offers graduate programs of study leading to the degrees of Master of Science and Doctor of Philosophy. These programs involve (1) broad training in those mathematical methods and techniques that have been found useful in applications, (2) in-depth study in at least one field of application, and (3) opportunities to explore various specialized aspects of applied mathematics.

Master of Science

Admission Requirements

Prospective students for the Master of Science program should hold an undergraduate degree either in mathematics with a strong background in applications such as the physical, engineering, biological, or social sciences with a strong background in applications-oriented mathematics. The student's record should be a strong one with an average grade of B (3.00 grade point) or better. Graduate Record Examination scores should be sent to the Graduate School. In addition to the other requirements for all applicants, a minimum score of 500 on the Test of English as a Foreign Language (TOEFL) must be presented by applicants who are not citizens of the United States unless they meet one of the following exceptions: citizens of Australia, Canada, Ireland, New Zealand, or the United Kingdom; or applicants holding bachelor's or advanced degrees from accredited institutions in the U.S. or in one of the countries listed above.

Degree Requirements

36-45 credits, as follows:

- * *Basic Course List:* AMATH 506 (4), AMATH 507 (5), AMATH 567 (5), AMATH 568 (5), AMATH 569 (5), AMATH 584 (5). Alternative program elements may be substituted, subject to the approval of the Applied Mathematics Graduate Committee.
- * *Field of Application:* This requirement is satisfied with a coherent sequence of two graduate (500-level) graded courses in a given field. Other alternatives may be appropriate. The following courses offered by the Applied Mathematics department are also designated as applications courses: AMATH 503 (3), AMATH 504 (3), AMATH 505 (4), AMATH 521 (5). The courses selected in the field of application must be approved by the student's advisor and the Graduate Committee.

Traditional fields of application include all branches of engineering, the physical sciences, biological sciences, computer science, economics and management science, and certain areas of medical science. Other fields may be approved by the Graduate Committee where appropriate. Mathematics and statistics are not fields of application.
- * *Applied Mathematics Seminar/Clinic:* All students must register for two quarters of AMATH 501 (1, max. 6) and two quarters of AMATH 502 (1, max. 6).
- * *Final Examination for Master's Degree:* The Graduate School requirement for the Final Examination is satisfied by an oral presentation by the candidate in the presence of his or her Graduate Committee on a current topic of interest from the literature or the results of original research. At least two members of the committee must sign the Master's Application (warrant) after they are satisfied that the various requirements for the degree are met and that the presentation is of high quality.
- * *Program Plan:* The student is assigned a faculty advisor. In order that studies progress satisfactorily and the degree requirements are met, a Program Plan must be filled out by the student, signed by the advisor, and approved by the Graduate Committee. For full-time students, a Program Plan must be on file no later than the end of the third quarter of registration. Part-time students should file their Program Plan prior to the end of their first three quarters of registration.
- * *Satisfactory Progress:* The student is expected to maintain a minimum 3.20 GPA. In addition, full-time students (whether self-supporting or under full scholarship or assistantship support) are normally expected to complete the requirements for an M.S. degree in one year and should not exceed two years. Exceptions will be granted only by petition to the Graduate Committee.

Doctor of Philosophy

Admission Requirements

- * Evidence of completion of course work equivalent to that described for the master's degree, with a minimum 3.40 GPA, and indication of the ability or potential to perform independent research.
- * Graduate Record Examination
- * Three letters of recommendation are required in support of each application and should be sent directly to the department.
- * In addition to the other requirements for all applicants, a minimum score of 500 on the Test of English as a Foreign Language (TOEFL) must be

presented by applicants who are not citizens of the United States unless they meet one of the following exceptions: citizens of Australia, Canada, Ireland, New Zealand, or the United Kingdom; or applicants holding bachelor's or advanced degrees from accredited institutions in the U.S. or in one of the countries listed above.

- * A graduate student is considered for admission to the Ph.D. program by the Graduate Committee after completing AMATH 567 (5), AMATH 568 (5), AMATH 584 (5), and AMATH 585 (5) with a grade of 3.4 or better in each course, as well as passing the Preliminary Examination.

Degree Requirements

Minimum 90 credits, as follows:

- * *Course Requirements:* AMATH 567 (5), AMATH 568 (5), AMATH 569 (5); AMATH 584 (5), AMATH 585 (5), AMATH 586 (5); three of AMATH 570 (5), AMATH 571 (5), AMATH 572 (5), AMATH 573 (5), AMATH 574 (5), AMATH 575 (5); either AMATH 507 (5) or AMATH 515 (5); AMATH 506 (4); two applications courses; 2 credits of departmental seminars; 2 credits of departmental clinics.
- * *Preliminary Exam:* Three written two-hour exams, covering a core of undergraduate material necessary for successful completion of the Ph.D. program. These core areas are differential equations, linear algebra, and advanced calculus.
- * *Supervisory Committee:* As soon as possible, and no later than the end of the spring quarter of the first year, a student should form a supervisory committee.
- * *Candidacy Requirements:* The student in the Ph.D. program attains the status of Candidate for the Doctor of Philosophy degree upon forming a supervisory committee, selecting two specialization areas, satisfying course requirements, and designing a doctoral research plan.
- * *General Examination:* The General Examination is administered after the student has passed the Preliminary Examination and sometime before the end of the student's second year.
- * *Final Examination:* The Final Examination consists of an oral presentation of the completed research in a seminar open to the public.

Financial Aid

Both research and teaching assistantships are available to full-time students who qualify. In addition, fellowship funds for the study of applied mathematics are available and awarded on a competitive basis. Research Facilities

Students in applied mathematics have access to a departmental computing lab equipped with a DEC Alpha server, Alpha/AXP workstations, and X-terminals, with centralized file storage. Software for scientific visualization, numerical analysis, symbolic mathematics, programming, and document preparation is available. The lab is connected to the campus network and the Internet, providing access to supercomputing facilities and other resources.

Course Descriptions

See page 284.

Art

104 Art

The School of Art serves a dual role within the educational structure of the University of Washington. It is both a professional school and an academic department. As a professional school it trains students for active careers in the visual arts; as a school of the College of Arts and Sciences it offers studio and lecture courses. All of its course offerings and its curriculum requirements are based on the underlying philosophy that an awareness and understanding of the visual arts are necessary to a liberal education, and that a liberal education is necessary to the training of a professional artist.

Undergraduate Program

Adviser
104 Art, Box 353440
206-543-0646
uaskart@u.washington.edu

The School of Art offers the following undergraduate programs:

- * The Bachelor of Arts degree with a major in art history, design studies (incorporates elements of the Bachelor of Fine Arts industrial design and visual communications design programs), interdisciplinary visual arts, or painting and drawing.
- * The Bachelor of Fine Arts degree with a major in ceramics, fibers, industrial design, metals, painting and drawing, photography, printmaking, sculpture, or visual communication design

Bachelor of Arts

Design Studies, Interdisciplinary Visual Arts (IVA), Painting and Drawing (Students may earn a Bachelor of Arts or a Bachelor of Fine Arts in Painting and Drawing, but not both.)

Department Admission Requirements

The minimum GPA for application to the School of Art is 2.50.

Admission to the Design Studies Major for Entering Freshmen, Currently Enrolled Students, or Transfer Students: Students must complete ART 166 (or equivalent), then apply to the major using the appropriate application process. See Program Guides on department homepage for specific information: <http://art.washington.edu/undergrad/programguides/index.html>.

Admission to the Interdisciplinary Visual Arts Major for Entering Freshmen or Currently Enrolled Students: After completing 5 credits of introductory level art (100/200 level), students meet with an Art adviser to declare the major.

Admission to the Interdisciplinary Visual Arts Major for Transfer Students: Students complete the equivalent of 5 credits of introductory art (100/200 level) prior to transferring. Once admitted to the UW, they meet with an Art adviser to declare the major. Prior to transfer, students may address questions to uaskart@u.washington.edu.

Admission to the Painting and Drawing Major for Entering Freshmen and Currently Enrolled Students: After completing ART 190, students meet with an Art adviser to declare the major.

Admission to the Painting and Drawing Major for Transfer Students: Once admitted to the UW, students meet with an Art adviser to enroll in ART 190. Students who transfer with college credits in painting and drawing may wish to present a portfolio for advanced placement in the program. Prior to transfer, students may address questions to uaskart@u.washington.edu.

Major Requirements

Design Studies (80 credits)

1. 5 credits prerequisite: ART 166
2. Successful completion of Design Admission Selection Process
3. 30 credits: ART 207, ART 208, ART 209, ART 210, ART 211, ART 212
4. 20 credits: ART 381, ART 481, ART 482 (repeated to 10 credits)
5. 15 credits electives from the following: ART 366, ART 368, ART 376, ART 377, ART 378, ART 467, ART 383, ART 483, ART 316, ART 317, ART 322, ART 446.
6. 10 credits of art history including ART H 203 and any non-western art history: ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 315, ART H 318, ART H 330, ART H 337.

Interdisciplinary Visual Arts (63 credits)

1. 20 credits of introductory art selected from ART 120, ART 124, ART 126, ART 131, ART 133, ART 140, ART 166, ART 190, ART 201, ART 202, ART 226, ART 227, ART 234, ART 245, ART 246, ART 258, ART 272, ART 273, ART 290, ART 292.
2. 25 upper division credits in art selected from ART 328, ART 329, ART 330, ART 332, ART 333, ART 334, ART 335, ART 338, ART 339, ART 342, ART 345, ART 350, ART 353, ART 354, ART 357, ART 358, ART 390, ART 392, ART 428, ART 436, ART 450, ART 457, ART 458, ART

485, ART 490, ART 492, ART 496, ART 498, ART 499, ART H 498, ART H 499.

3. 18 credits in art history, with a minimum 8 upper division credits, to include one from ART H 203, ART H 380, ART H 381, or ART H 384; one non-western course from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART 330, ART H 331, or ART H 337.

Painting and Drawing (65 credits)

1. 5 credits: ART 190
2. 20 credits drawing classes: 5 credits ART 290; 10 credits ART 390; 5 credits ART 490
3. 25 credits painting classes: 10 credits ART 292; 10 credits ART 392; 5 credits ART 492
4. 15 credits art history (with a minimum 5 upper division) to include one from ART H 203, ART H 380, ART H 381, or ART H 384; one non-western from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, or ART H 337.

Bachelor of Fine Arts

Ceramics, Fibers, Industrial Design, Metals, Painting & Drawing (Students may earn a Bachelor of Fine Arts or a Bachelor of Arts in Painting & Drawing, but not both), Photography, Printmaking, Sculpture, Visual Communication Design

Department Admission Requirements

The minimum GPA for admission to School of Art BFA programs is 3.00.

Note: The Printmaking program will not admit new majors during the 2005/2006 academic year.

For entering freshmen or currently enrolled students

Admission to Ceramics, Fibers, Metals, Painting & Drawing, and Sculpture: Students complete the prerequisite art course unique to each major (ART 201 for ceramics; ART 226 or ART 227 for fibers; ART 258 for metals; ART 190 for painting & drawing; ART 272 or ART 273 for sculpture), then meet with an Art adviser to declare the major.

Admission to Industrial Design, Photography, and Visual Communication Design: Students must complete prerequisite courses unique to each major (see Major Requirements, below). Students then apply to the major using the appropriate application process. Each major has its own unique application process; see Program Guides on department homepage for specific information: <http://art.washington.edu/undergrad/programguides/index.html>.

For transfer students

Admission to Ceramics, Fibers, Metals, Painting & Drawing, and Sculpture: Once admitted to the UW, students meet with an Art adviser to enroll in the appropriate art course (ART 201 for ceramics; ART 226 or ART 227 for fibers; ART 258 for metals; ART 190 for painting & drawing; ART 272 or ART 273 for sculpture). Students who transfer with college credits in the proposed area of study may wish to present a portfolio for advanced placement in the program. Prior to transfer, students may address questions to uaskart@u.washington.edu.

Admission to Industrial Design, Photography, and Visual Communication Design: Students must complete prerequisite courses unique to each major (see Major Requirements, below). Students then apply to the major using the appropriate application process and submitting a portfolio. Each major has its own unique application process; see Program Guides on department homepage for specific information: <http://art.washington.edu/undergrad/programguides/index.html>.

Admission Policy for Postbaccalaureate Applicants: Postbaccalaureate study in studio art is limited; admission requirements vary within each major. See information concerning specific postbaccalaureate admission online at <http://art.washington.edu>.

Major Requirements

Ceramics (85 credits)

1. 10 credits ART 201, ART 202
2. 15 credits ART 353.
3. 20 credits ART 485
4. 25 credits art or related electives to include ART 120
5. 15 credits art history (with a minimum 5 upper division) to include one from ART H 203, ART H 380, ART H 384, or ART H 381; one non-western from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, or ART H 337.

Fibers (85 credits)

1. 10 credits ART 226, ART 227
2. 25 credits ART 330, ART 328, ART 329
3. 15 credits ART 428
4. 20 credits art or related electives to include ART 120
5. 15 credits art history (with a minimum 5 upper division) to include one from ART H 203, ART H 380, ART H 384, or ART H 381; one non-western from ART H 204, ART H 205, ART H 206, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, or ART H 337.

Industrial Design (90 credits)

1. 5 credits prerequisite: ART 166
2. Successful completion of Design Admission Selection Process
3. 30 credits: ART 207, ART 208, ART 209, ART 210, ART 211, ART 212
4. 30 credits: ART 316, ART 317, ART 318, ART 322, ART 422, ART 321
5. 15 credits: ART 445, ART 446, ART 447.
6. 10 credits of art history including ART H 203 and any non-western art history: ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 315, ART H 318, ART H 330, ART H 337.

Metals (85 credits)

1. 5 credits ART 258
2. 25 credits selected from ART 357, ART 358, ART 354
3. 15 credits ART 460
4. 25 credits art or related electives to include ART 120 and ART 190 or transfer equivalents
5. 15 credits art history (with a minimum 5 upper division) to include one from ART H 203, ART H 380, ART H 384, or ART H 381; one non-western from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, or ART H 337

Painting & Drawing (110 credits)

1. 5 credits, ART 190.
2. 20 credits drawing classes: 5 credits ART 290; 10 credits ART 390; 5 credits ART 490.
3. 45 credits painting classes: 10 credits ART 292; 10 credits ART 392; 10 credits ART 492; 15 credits ART 494.
4. 25 credits studio art or related electives.
5. 15 credits of art history with a minimum 5 upper division to include one from ART H 203, ART H 380, ART H 384, or ART H 381; one non-western art history from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, ART H 337.

Photography (85 credits total)

1. 15 credits prerequisites: 5 credits from ART 140; 5 credits from ART 124, ART 126, ART 166, or ART 190; 5 credits from ART H 232.
2. Successful completion of Photography Portfolio Review.
3. 5 credits ART 241 (autumn quarter only).
4. 25 credits: 5 credits ART 340; 5 credits ART 341; 5 credits ART 342; 10 credits ART 343.
5. 15 credits ART 440 (spring, autumn, winter quarters).
6. 15 credits studio art or related electives.
7. 10 credits of art history including ART H 203 and any non-western art history: ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 315, ART H 318, ART H 330, ART H 337.

Printmaking (85 credits)

Not available academic year 2005-2006.

Sculpture (85 credits)

1. 10 credits ART 272, ART 273
2. 25 credits ART 332, ART 333, ART 334, ART 335
3. 10 credits ART 436.
4. 25 credits art or related electives, to include ART 120.
5. 15 credits art history (with a minimum 5 upper division) to include one from ART H 203, ART H 380, ART H 384, or ART H 381; one non-western from ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 312, ART H 313, ART H 315, ART H 318, ART H 321, ART H 330, ART H 331, or ART H 337

Visual Communication Design (100 credits)

1. 5 credits prerequisite: ART 166.
2. Successful completion of Design Admission Selection Process.
3. 30 credits: ART 207, ART 208, ART 209, ART 210, ART 211, ART 212
4. 30 credits: ART 366, ART 376, ART 367, ART 377, ART 368, ART 378
5. 25 credits: ART 466, ART 478, ART 467, ART 479, ART 480
6. 10 credits of art history including ART H 203 and any non-western art history: ART H 204, ART H 205, ART H 206, ART H 230, ART H 311, ART H 315, ART H 318, ART H 330, ART H 337.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Students receiving an undergraduate degree in art can expect to develop strong writing, analytical, critical-thinking, and problem-solving skills. Students learn to recognize the power of the visual image and understand its importance in a world increasingly dependent on the aesthetic and technical skill of trained artists and designers to create images that communicate information and ideas across cultures and generations.

In addition to becoming practicing artists, art graduates find careers in fields such as gallery and museum management, arts education, arts administration, photojournalism, film making, graphic and product design, interior design, teaching, advertising, art therapy, and visual and digital technology.

* *Instructional and Research Facilities:* None.

* *Honors Options Available:* None.

* *Research, Internships, and Service Learning:* The School of Art has several programs that help students develop professional practices and expand their knowledge outside the UW: internships for credit, Artist in Residence programs, K-12 Educational Partnerships, Art on Loan, and the Studio Art Rome program.

* *Department Scholarships:* None.

* *Student Organizations/Associations:* Students majoring in the studio arts have the opportunity to participate in several student associations: Hephestium (metals), Zeeware (ceramics), Broadclothes (fiber), Printmakers Association (printmaking), a photo guild, and the Inter Arts Council. These organizations raise funds through the sale of members' work to support visiting artists and lectures and to sponsor student involvement in regional arts events.

Graduate Program

Graduate Program Coordinator
104 Art Building, Box 353440
206-543-0646
gradart@u.washington.edu

The Master of Fine Arts program offers an intense, two-year studio and seminar/classroom experience leading to an advanced degree in visual art. The program builds on prior, significant academic experience and studio work. Admission is on a competitive basis to any one of the following seven programs: Ceramics, Fibers, Metals, Painting, Photography, Sculpture, and Visual Communication Design.

The master's degree program in Art History at the University of Washington affirms that the M.A. degree is an independent degree useful in its own

right. Successful applicants to the program normally have a broad undergraduate background in art history.

The Ph.D. program in the Division of Art History prepares graduates for university-level teaching, curator positions at major museums, and independent research in the field. Before beginning work for the Ph.D., students should have completed a Master of Arts degree in the history of art.

Master of Fine Arts

Admission Requirements

Applicants for admission to the Master of Fine Arts program are required to have a Bachelor of Fine Arts degree or equivalent (determined by the quality of the applicant's work and equivalent experience, based upon the UW B.F.A. requirements) with a minimum GPA of 3.00 in the undergraduate art major.

The Graduate Record Examination is not required. Admission is on a competitive basis. Annual deadline for applications is February 1, for consideration for admission the following autumn quarter.

Degree Requirements

For each program, 90 credits are required, as follows:

Ceramics

- * *Ceramics studio*: 20 credits of ART 553
- * *Interdisciplinary seminar*: 25 credits of ART 590
- * *Art history, theory, and criticism*: 10 credits of approved courses
- * *Studio electives*: 15 credits of approved electives
- * *Thesis*: 20 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Ceramic grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery along with a one person show at the Ceramics Gallery.

Fibers

- * *Fibers studio*: 20 credits of ART 540
- * *Interdisciplinary seminar*: 25 credits of ART 590
- * *Art history, theory, and criticism*: 10 credits of approved courses
- * *Studio electives*: 20 credits of approved electives
- * *Thesis*: 15 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Fibers grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Metals

- * *Metals studio*: 20 credits of ART 558
- * *Interdisciplinary seminar*: 25 credits of ART 590
- * *Art history, theory, and criticism*: 15 credits of approved courses
- * *Studio electives*: 20 credits of approved electives
- * *Thesis*: 15 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Metals grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Painting and Drawing

- * *Drawing studio*: 6 credits of ART 591
- * *Painting studio*: 25 credits of ART 592
- * *Graduate seminar*: 30 credits of ART 594
- * *Art history, theory, and criticism*: 10 credits of approved courses
- * *Studio electives*: 9 credits of approved electives
- * *Thesis*: 10 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Painting and Drawing grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Photography

- * *Photography studio*: 20 credits of ART 515
- * *Interdisciplinary seminar*: 25 credits of ART 590
- * *Art history, theory, and criticism*: 15 credits of approved courses
- * *Studio electives*: 15 credits of approved electives

- * *Thesis*: 15 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Photography grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Sculpture

- * *Sculpture studio*: 20 credits of ART 552
- * *Interdisciplinary seminar*: 25 credits of ART 590
- * *Art history, theory, and criticism*: 10 credits of approved courses
- * *Studio electives*: 15 credits of approved electives
- * *Thesis*: 20 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Sculpture grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Visual Communication Design

- * *Design studio*: 25 credits of ART 580/ART 582
- * *Design seminar*: 20 credits of ART 581
- * *Art history, theory, and criticism*: 15 credits of approved courses
- * *Studio electives*: 20 credits of approved electives
- * *Thesis*: 10 credits of ART 700. The thesis is a natural outgrowth of the student's work. It can consist of one major work or a body of work that involves one central theme. Design grads exhibit their thesis work in the annual MFA exhibition at the Henry Art Gallery.

Master of Arts

Admission Requirements

- * B.A. degree with art history major or equivalent course work with a minimum GPA of 3.00 or B average in art history courses; students in other majors may apply if they have a strong background in art history.
- * Official GRE General Test scores.

Degree Requirements

The M.A. program offers both thesis and non-thesis tracks in Art History. The thesis track requires a minimum of 55, and the non-thesis (practicum) track 65, graduate-level credits, to include:

- * A minimum of 5 numerically graded credits in four of the five major areas: 1) African and Native American; 2) East Asian; 3) Ancient, Classical, and Medieval; 4) Italian and Northern Renaissance, Baroque, and Rococo; 5) Western, late 19th c. to the present.
- * A minimum of 15 credits in 500-level seminars, including at least one seminar each in a Western and a non-Western area; also, two methodology seminars to be taken in the first year
- * For students in the thesis track, at least 10 credits of ART H 700 (Master's Thesis); for the non-thesis track, at least 10 credits of ART H 598 (Master's Practicum)
- * All degree candidates are required to demonstrate a knowledge of either French, German or Italian, or Chinese or Japanese where appropriate. Degree candidates specializing in Native American art may substitute Spanish for French or German. Students in the thesis track are required additionally to demonstrate knowledge in a second language appropriate to the student's area of study. Petitions for exemption from the second language requirement will be considered as warranted by the needs of different fields or projects.
- * The thesis may be an extension of a seminar paper and must demonstrate the student's ability to conduct rigorous research, indicate familiarity with bibliographical and reference materials, and show a capacity for the synthesis and critical evaluation of the material under consideration.
- * The practicum must evidence the student's practical or theoretical knowledge of some aspects of art in historical or contemporary situations, and may take any of a variety of forms, either within or outside the academic offerings of the University, e.g., an internship in a public art museum or the publication of critical, educational or other writings. These requirements are minimum M.A. requirements for the Division of Art History. To be eligible for a degree in the Graduate School, a minimum grade point average of 3.00 in numerically graded courses numbered 400 and above is required.

Doctor of Philosophy

Admission Requirements

- * M.A. degree in art history or a closely related field with a minimum 3.00 or B average in art history courses.
- * Official GRE General Test scores.

Degree Requirements

The Ph.D. program requires a minimum of 90 credits, as follows:

- * A minimum of 60 credits in art history in numerically graded courses numbered 400 and above, beyond the M.A. Of these 60, at least 30 credits must be in 500-level art history or approved non-art history seminars
- * A maximum of 20 credits in related fields (in numerically graded courses numbered 300 and above) may be approved for credit in place of art history courses
- * A minimum of 10 credits must be taken in an area other than areas to be tested by the General Examination.
- * All doctoral students are required to demonstrate a knowledge of either French, German or Italian, or of Chinese or Japanese where appropriate; to demonstrate a research capability in a second language appropriate to the student's area of study as determined by the faculty; and to demonstrate a knowledge of any further languages judged necessary by the faculty
- * A minimum of 30 dissertation credits
- * A General Examination, written and oral, will be taken when in the opinion of the student's supervisory committee the student's background is sufficient to justify its undertaking. The fields to be covered will be determined in accordance with the student's interests and the faculty's supervisory capabilities.
- * These requirements are minimum Ph.D. requirements for the Division of Art History. To be eligible for a degree in the Graduate School, a grade point average of 3.0 in numerically graded courses numbered 400 and above is required.

Scholarships and Teaching Assistantships

School of Art scholarships are awarded annually to new and returning students, based on merit. Applicants admitted to the M.F.A. program may be offered School of Art scholarships for the coming year on an individual merit basis. Further application is not required.

The School of Art offers a limited number of teaching assistantships to incoming graduate students on an individual merit basis, as determined by each program. Enrolled graduate students may apply for a limited number of additional, competitive teaching assistantships.

Course Descriptions

See page 286.

Art History

209 Art

Art history is the study of the creation, style, and meaning of works of art in relation to the artists and societies that created them. The history of art involves the interaction of styles, techniques, concepts, individual personalities, and social values from many places over long periods of time. This discipline is comparative in nature and requires many different skills, derived from the study of history and culture, foreign languages and literature, iconography, stylistic analysis, and connoisseurship.

Undergraduate Program

Adviser
104 Art, Box 353440
206-543-0646
uaskart@u.washington.edu

The Division of Art History offers the following undergraduate programs:

- * The Bachelor of Arts degree with a major in art history
- * A minor in art history

Bachelor of Arts

Suggested First- and Second-Year College Courses: ART H 201, ART H 202, ART H 203, ART H 204, ART H 205, ART H 206. Courses to enhance writing skills, and courses in history, literature, anthropology, classics, and foreign languages.

Department Admission Requirements

Entering freshmen and transfer students may declare an Art History major by scheduling an appointment with the Art History adviser on or after their orientation/registration date. Currently enrolled University students who wish to declare an Art History major must have a minimum 2.50 GPA and meet with the adviser anytime during the quarter except the first week.

Admission Policy for Postbaccalaureate Applicants: Postbaccalaureate study in Art History is limited. Acceptance is competitive, based upon transcripts of prior college work and a School of Art Supplemental Information Form.

Major Requirements

55 credits in art history, including one course from each of the following four groups plus three 400-level art history courses:

1. ART H 201, ART H 202, ART H 290, ART H 340, ART H 341, ART H 342, ART H 343, ART H 351, ART H 352, ART H 361, or ART H 373
2. ART H 204, ART H 306, ART H 311, ART H 315, ART H 316, or ART H 321
3. ART H 205, ART H 206, ART H 230, ART H 330, ART H 331, or ART H 337
4. ART H 203, ART H 232, ART H 380, ART H 381, ART H 382, or ART H 384.

Minor

Minor Requirements: 30 credits of art history courses, of which 15 must be upper-division courses. Minimum grade of 2.0 required in each course applied to the minor. At least 15 credits must be completed at the UW.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Students studying in the field of art history can expect to develop strong writing, research, analytical, critical thinking, and problem-solving skills. Course work is designed to allow students to comprehend the social, historical, ethical, and aesthetic significance of the visual realm that is our present environment and the heritage of many cultures. Art history graduates pursue careers in fields such as gallery and museum management, visual technology, teaching, arts administration, arts education, research, curating and restoration, interior design, and art and antique connoisseurship.

* *Instructional and Research Facilities:* None

* *Honors Options Available:* With College Honors. With Departmental Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* The Art History Program is based in the School of Art where majors work side by side with students studying in the studio arts. They have direct access to the Art Library, Media Center, Writing Center, a state of the art Computer Center, and three active art galleries. Classes are taught in rooms equipped with the technology needed to address all the issues and complexities of a visual culture. Many art history classes are conducted at local galleries and museums where students receive first-hand knowledge of the visual arts. Enrichments outside the classroom include one quarter study abroad in

Rome, opportunities to work one on one with faculty in research projects, and workshops and presentations by visiting artists and scholars.

- * *Department Scholarships:* Art history majors compete each year for several major scholarships in the School of Art: Austin Award (\$3,000), Marsh Scholarship (\$3,000), and Milnor Roberts Award (\$4,000). They are also eligible for smaller awards of excellence that range from \$500 to \$1,000. Applications are made in early April and scholarship winners are announced at the annual School of Art Open House in late April.

In addition to these awards, students are also encouraged to apply for the Nordstrom Research and Recognition Awards that support special projects, research, and professional development.

The \$2,000 Lockitch Graduating with Excellence Award is presented each year at the School of Art Graduation Celebration to the top undergraduate in Art History.

- * *Student Organizations/Associations:* Art history majors have opportunities to serve on School of Art committees which include: Open House, Gallery, Graduation Celebration, Curriculum, Space, and Career Week.

Of Special Note: Art history majors anticipating graduate study should acquire a reading knowledge of French, German, Chinese, Italian, or Japanese.

Graduate Program

Graduate Program Coordinator
209 Art, Box 353440
206-543-4876
uwah@u.washington.edu

Master of Arts

Admission Requirements

1. Bachelor of Arts degree with major in the history of art, or equivalent course work
2. One copy of all academic transcripts (international applicants must submit two copies)
3. Three letters of recommendation
4. Statement of professional objectives in the field
5. Samples of the applicant's written work
6. Taking the Graduate Record Examination is required.

Degree Requirements

1. 55 credits in the thesis track or 65 credits in the non-thesis track. Of these credits, a minimum of 45 credits in the thesis track or 55 credits in the non-thesis track must be numerically graded art history courses numbered 400 and above, exclusive of thesis or practicum credits. A maximum of 10 credits in related fields, in numerically graded courses numbered 300 and above, may be approved for credit in place of art history courses. No more than 12 credits of ART H 600 may be counted toward the minimum credit requirement for the Master of Arts degree.
2. A minimum of 5 numerically graded credits must be taken in four of five major areas: African or Native American; East Asian; Ancient, Classical, and Medieval; Italian and Northern Renaissance, Baroque, and Rococo; or late eighteenth- to twentieth-first-century Western.
3. A minimum of 15 credits must be taken in 500-level seminars, in addition to ART H 500, Methods of Art History, and ART H 504, Methodology II, both of which must be taken within the first year of residence. At least one seminar each in a Western and a non-Western area is required.
4. A knowledge of either French, German, or Italian, or of Chinese or Japanese if appropriate. Degree candidates specializing in Native American art may substitute Spanish for French, German, or Italian. Candidates in the thesis track are required, in addition, to demonstrate knowledge in a second language appropriate to the student's area of study as determined by the faculty. Petitions to the Faculty Graduate Committee for exemption from the second language requirement will be considered as warranted by the needs of different fields or projects. Language requirements may be satisfied by passing graduate proficiency examinations (available in French, German, Italian, and Spanish), or by completing the third quarter of the second year of French, German, Italian, Chinese, Japanese, or other appropriate language as a graduate student at the University of Washington with a minimum grade of 3.0.

Students are expected to satisfy at least one of the language requirements no later than the first quarter of residence in the program.

5. Students in the thesis track must take 10 thesis credits in ART H 700 in preparation for the written presentation and oral defense of a thesis that demonstrates the ability to conduct rigorous research, familiarity with relevant sources, and a capacity for synthesis and critical evaluation; students in the non-thesis track must take 10 practicum credits in ART H 598, a practical or theoretical program designed in conjunction with the faculty and defended by means of a final written report and oral examination.

Doctor of Philosophy

Admission Requirements

1. Prior sound preparation in art history at a general level, which usually means having acquired the Master of Arts degree in the history of art
2. One copy of all academic transcripts (international applicants must submit two copies)
3. Three letters of recommendation
4. Statement of professional objectives in the discipline
5. Samples of written research work in art history. Taking the Graduate Record Examination is required.

Degree Requirements

Minimum of 90 credits, which include:

1. 60 credits in numerically graded art history courses numbered 400 and above, beyond the Master of Arts degree or equivalent, and exclusive of dissertation credits; a maximum of 20 credits in related fields in numerically graded courses numbered 300 and above may be approved for credit in place of art history courses; a minimum of 10 credits must be in areas other than those tested by the General Examination; at least 30 credits must be in 500-level seminars.
2. Knowledge of German, French, or Italian, or of Chinese or Japanese if appropriate; a research capability in a second language adjudged appropriate to the student's area of study; a knowledge of any other languages considered necessary by the faculty. Language requirements may be satisfied by passing graduate-proficiency examinations (available in French, German, Italian, and Spanish), or by completing the third quarter of second-year French, German, Italian, Chinese, Japanese, or other appropriate language as a graduate student at the University with a minimum grade of 3.0.
3. A General Examination, written and oral, taken prior to enrollment for dissertation credits; this examination covers three specific fields of art history chosen from the following general areas: African, Native American, Chinese, Japanese, Ancient, Medieval, Renaissance, Baroque and eighteenth century, Modern, and Contemporary; no more than two fields may be selected from the same area.
4. 30 dissertation credits in ART H 800 taken after the General Examination in preparation and defense of the dissertation. These credits must be distributed over a minimum of three quarters.
5. A dissertation demonstrating original and independent investigation and achievement.

Financial Aid

The Art History division offers certain scholarship funds, as well as teaching assistantships, for art history graduate students. A small number of grants are awarded to outstanding entering students, but it is otherwise a policy to award financial aid and assistantships only to students who have completed at least one year of graduate study.

Course Descriptions

See page 289.

Asian Languages and Literature

225 Gowen

The Department of Asian Languages and Literature offers instruction in the principal languages and literatures of Asia, including East, Southeast, Central, and South Asia. Emphasis is placed on the roles of these languages within the cultures they serve as well as on linguistic, textual, and literary analysis. Courses on Asian literature in English are offered for majors and nonmajors alike.

Undergraduate Program

Adviser
223A Gowen, Box 353521
206-543-4996

The Department of Asian Languages and Literature offers the following undergraduate programs:

- * The Bachelor of Arts degree with majors in Chinese, Japanese (with either a linguistic or literature concentration), Korean, and South Asian languages
- * Minors in Chinese, Hindi, Japanese, and Sanskrit

Bachelor of Arts

Suggested First- and Second-Year College Courses: First and second years of the target foreign language(s): Chinese, Japanese, Korean, or South Asian (Hindi or Sanskrit). Any courses relating to the area or discipline of major study.

Department Admission Requirements

1. Completion of at least 20 credits of college course work (or department-approved equivalent) in the intended primary language of concentration. The most recent course completed in the intended primary language of concentration must be a course taken at the UW, and the final grade in the most recent course in that language must be 2.5 or higher.
2. Completion of one writing course (W-prefix) taught in English with a minimum grade of 2.0.
3. The department prefers that prospective majors present a cumulative GPA of 2.50 or higher. Applicants may submit materials in addition to transcripts clarifying any aspect of past course work. Denied applicants may appeal.
4. Transfer students must be enrolled at the UW before applying to the major.

Note: A student entering the junior year without two years of the appropriate foreign language will not be able to complete the degree requirements in two years unless he or she takes accelerated courses such as Chinese or Japanese at the UW during summer quarter.

Major Requirements

Chinese

75 credits, as follows:

1. *Language courses:* 30 credits required, including a minimum of 20 beyond the third-year level. Must include CHIN 451, plus other courses drawn from CHIN 411, CHIN 412, CHIN 413, CHIN 421, CHIN 422, CHIN 423, CHIN 452, CHIN 453, CHIN 470, and CHIN 482.
2. *Linguistics courses:* 5 credits required (CHIN 342); an additional 5 credits optional (CHIN 443).
3. *Literature courses:* 15 credits required (10 if the optional 5 linguistics credits are taken). Courses may be drawn from ASIAN 201, ASIAN 204, ASIAN 211, ASIAN 263, CHIN 373, CHIN 374, CHIN 380, CHIN 381, CHIN 385, CHIN 461, CHIN 462, CHIN 463, and Chinese literature courses offered in the Department of Comparative Literature.
4. *China-related humanities and social science courses:* 25 credits required. Must include HSTAS 211, plus other courses explicitly related to China from such departments as Anthropology, Art, History, International Studies, Linguistics, and Sociology.

Japanese

75 credits as follows:

45 credits in language, including 30 credits beyond the second year, selected according to the student's choice of literature or linguistics concentration; 20 credits of a literature or linguistics sequence; and 10 credits of area-related humanities and social sciences, as follows:

1. Literature Concentration
 - a. Language: 45 credits, with a minimum of 30 credits beyond the second year. (Second year: JAPAN 211, JAPAN 212, JAPAN 213; third year: JAPAN 311, JAPAN 312, JAPAN 313; fourth year: 15 credits from JAPAN 431, JAPAN 432, JAPAN 433, JAPAN 445, JAPAN 471, JAPAN 472, and JAPAN 473.)

Students who, upon the determination of the faculty in Japanese, are permitted to begin their study of Japanese at the University at a level higher than JAPAN 211, substitute, in consultation with the undergraduate adviser, an equivalent number of credits in additional courses drawn from JAPAN 431, 432, JAPAN 433, JAPAN 445, JAPAN 471, JAPAN 472, JAPAN 473, and with prior approval, other Japan-related humanities or social science courses.

- b. Literature sequence: 20 credits, including JAPAN 321, JAPAN 322, JAPAN 323, and 5 credits from JAPAN 395, JAPAN 431, JAPAN 432, JAPAN 433, JAPAN 460, JAPAN 471, JAPAN 472, and JAPAN 473, if not used to satisfy the language requirement.

- c. Area-related humanities or social science courses: 10 credits at the 300 level or above, at least 5 of which must be from outside the Department of Asian Languages and Literature; may be taken from JAPAN 342, JAPAN 343, JAPAN 395, JAPAN 440, JAPAN 442, JAPAN 443, and JAPAN 460; other Japanese literature courses not used to meet the literature requirement; and related courses from other departments.

2. Linguistics Concentration

- a. Language: 45 credits, with a minimum of 30 credits beyond the second year. (Second year: JAPAN 211, JAPAN 212, JAPAN 213; third year: JAPAN 311, JAPAN 312, JAPAN 313; fourth year: 15 credits from JAPAN 421, JAPAN 422, JAPAN 423, JAPAN 431, JAPAN 432, JAPAN 433, JAPAN 445, JAPAN 471, JAPAN 472, and JAPAN 473)

Students who, upon the determination of the faculty in Japanese, are permitted to begin their study of Japanese at the University at a level higher than JAPAN 211, substitute, in consultation with the undergraduate adviser, an equivalent number of credits in additional courses drawn from JAPAN 431, JAPAN 432, JAPAN 433, JAPAN 445, JAPAN 471, JAPAN 472, JAPAN 473, and with prior approval, other Japan-related humanities or social science courses.

- b. Linguistics sequence: 20 credits, including at least 15 credits from JAPAN 342, JAPAN 343, JAPAN 395, JAPAN 440, JAPAN 442, JAPAN 443; 5 of the 20 credits may come from JAPAN 321, JAPAN 322, JAPAN 323, JAPAN 460, JAPAN 471, JAPAN 472, JAPAN 473, LING 400, or related courses from other departments.

- c. Area-related humanities or social science courses: 10 credits at the 300 level or above, at least 5 of which must be from outside the Department of Asian Languages and Literature; may be taken from LING 400, JAPAN 321, JAPAN 322, JAPAN 323, JAPAN 395, JAPAN 460, JAPAN 471, JAPAN 472, and JAPAN 473; or related courses from other departments.

Korean

75 credits as follows:

1. 45 credits in the Korean language, 15 beyond second-year level
2. 30 credits in literature and area-related humanities or social science courses

South Asian Languages

75 credits as follows:

1. 60 credits in languages, of which 45 are in the major language, 15 in the minor language
2. 15 credits in area-related humanities or social science courses to be chosen in consultation with adviser and to include HSTAS 201 and ASIAN 401

Minor

Minor Requirements

Chinese: 30 credits as follows:

1. *Language courses:* 15 credits at or above the third-year level. Must include CHIN 451, plus other courses drawn from among CHIN 301, CHIN 302, CHIN 303, CHIN 411, CHIN 412, CHIN 413, CHIN 421, CHIN 422, CHIN 423, CHIN 452, CHIN 453, CHIN 470, and CHIN 482.
2. *China-related humanities courses:* 15 credits drawn from among the following: ASIAN 201, ASIAN 204, ASIAN 211, ASIAN 263 (when China is the topic), CHIN 342 (or CHIN 442), CHIN 373, CHIN 374, CHIN 380, CHIN 381, CHIN 385, CHIN 443, and CHIN 461, CHIN 462, CHIN 463.

Hindi: 30 credits as follows:

1. 15 language credits at the second-year level (HINDI 321, HINDI 322, HINDI 323) or above
2. 15 credits in area-related humanities courses to include either ASIAN 203 or ASIAN 206 and any of the following: ART H 306; HSTAS 201, HSTAS 202, HSTAS 401, HSTAS 402, HSTAS 403, HSTAS 404; PHIL 386, PHIL 412; RELIG 352, RELIG 354

Japanese: 30 credits as follows:

1. 15 language credits at the third-year level (JAPAN 311, JAPAN 312, JAPAN 313) or above
2. 15 credits in additional language or literature/culture courses. Acceptable courses include, but are not limited to: JAPAN 321, JAPAN 322, JAPAN 323, JAPAN 342, JAPAN 343, JAPAN 431, JAPAN 432, JAPAN 433, JAPAN 440, JAPAN 442, JAPAN 443, JAPAN 460, JAPAN 471, JAPAN 472, JAPAN 473; ART H 316, ART H 317; ART 321; ECON 494; GEOG 313; HSTAS 422, HSTAS 423; MUSIC 495; POL S 435. Acceptable language courses include those offered by the Technical Japanese program, the Jackson School of International Studies, the School of Law, and the School of Business Administration

Sanskrit: 30 credits as follows:

1. 15 language credits at the second-year level (SNKRT 401, SNKRT 402, SNKRT 403) or above
2. 15 credits in area-related humanities courses to include either ASIAN 203 or ASIAN 206 and any of the following: ART H 306; HSTAS 201, HSTAS 202, HSTAS 401, HSTAS 402, HSTAS 403, HSTAS 404; PHIL 386, PHIL 412; RELIG 352, RELIG 354

At least half of the credits for the minor must be taken at the UW.

Student Outcomes and Opportunities

- * *Instructional and Research Facilities:* None
- * *Honors Program:* With College Honors. With Departmental Distinction. See adviser for details.
- * *Research, Internships, and Service Learning:* None offered
- * *Department Scholarships:* None offered
- * *Student Organizations/Associations:* None

Graduate Program

Graduate Program Coordinator
225 Gowen, Box 353521
206-543-4996

The Department of Asian Languages and Literature offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees with specializations in (1) the languages and literatures of China; (2) the language and literature of Japan; (3) the languages and literatures of South Asia, subsuming Sanskrit and Hindi; (4) the language and literature of Korea. All graduate students in the department must affiliate themselves with one of these programs. The department does not offer degrees or specializations in language pedagogy.

Master of Arts, Buddhist Studies

Admission Requirements

- * An undergraduate major in the language and literature of specialization (four years of language training for admission to the Chinese and Japanese programs; fewer years of language acquisition may be acceptable in South Asian languages), or the background and training equivalent to such a major. Students without such a background may be qualified for admission, but will need to acquire the program prerequisites during the earliest stages of their graduate study.
- * A statement of academic goals
- * Three letters of recommendation addressed to the Graduate Program Coordinator.

Degree Requirements

45-54 credits plus language requirements, as follows:

- * **Coursework requirement:**
 - o *Non-thesis program:* 45 course credits, 18 of which must be at the 500 level and above. Buddhist Studies seminars and text reading courses offered within the department must be included. Students are also required to complete language study through the fourth-year level in their major language and through the second-year level in a second Asian language.
 - o *Thesis program:* 45 course credits plus 9 thesis credits. At least 18 of the 45 credits must be taken at the 500 level or above. Buddhist Studies seminars and text reading courses offered within the department must be included. The language requirements in this program are the same as in the non-thesis program. In addition, the student must write an acceptable M.A. thesis according to the rules and policies of the Department of Asian Languages and Literature and pass an oral examination.
- * **Foreign language requirements:** Students must demonstrate competence in their major language, and must complete the course requirements in their second Asian language as outlined above. These two languages may include one classical language and one relevant modern language, or two classical languages. In either case, one of the languages must be Sanskrit. In addition, students must demonstrate through a written examination reading knowledge of one foreign language relevant to their area of specialization, which must be other than English and the student's native language. It may be the student's second Asian language or a European or Asian research language.

Master of Arts, Chinese

Admission Requirements

- * A minimum undergraduate GPA of 3.00 in the junior and senior years
- * Three letters of recommendation and a statement of purpose.
- * Strong undergraduate preparation in one of the following: Chinese language and literature, another foreign language and literature, Asian regional studies, comparative literature, linguistics, English, philosophy, or history. Applicants are also expected to have completed four years of modern Chinese and one year of classical Chinese, each with a minimum GPA of 3.00.
- * Students lacking such preparation may be admitted to the M.A. program provisionally, and will be required to make up the deficiencies during their first year of residence.

Degree Requirements

38-40 credits, as follows:

Degree requirements: Two options are available to the student in the M.A. degree program: (1) a thesis program, and (2) a non-thesis program which requires two seminar or research papers in lieu of a thesis, and two 500-level departmental courses in addition to the requirements specified below.

- * *Coursework requirements:*
 - o *Second-Year Classical Chinese, 15 credits:* CHIN 551, CHIN 552, CHIN 553 (5, 5, 5)
 - o *Methods and Materials, 5 credits:* CHIN 559 (5)
 - o *History of Chinese Literature, 5 credits:* Any one course of the following three-quarter sequence: CHIN 461, CHIN 462, CHIN 463 (5, 5, 5)
 - o *The Chinese Language, 5 credits:* CHIN 442 (5)
 - o At least one course from each of the following two groups, 8-10 credits:

- * Group I -- Literature: CHIN 461, CHIN 462, CHIN 463 (5, 5, 5); CHIN 482 (5); CHIN 554, CHIN 555, CHIN 556 (5, 5, 5); CHIN 561, CHIN 562, CHIN 563 (5, 5, 5); CHIN 573 (5, max. 15); CHIN 575 (5, max. 15); CHIN 580 (5, max. 15); CHIN 582 (5, max. 15); CHIN 583 (5); CHIN 590 (5); CHIN 591, CHIN 592, CHIN 593 (5, 5, 5)
- * Group II -- Linguistics and Philology: CHIN 443 (5); CHIN 531, CHIN 532, CHIN 533 (3, 3, 3); CHIN 540 (3, max. 9); CHIN 541 (3, max. 9); CHIN 542 (3); CHIN 544 (3, max. 9); CHIN 557 (5); CHIN 558 (3)
- * *Foreign language requirement:* For the M.A. in Chinese, the additional language requirement must be fulfilled through a graduate reading examination. The additional language may be another Asian language or a European language, but may not be the student's native language, and must be relevant to the student's program of study.
- * M.A. Examination: Examination in Chinese will cover Chinese literature, and the second part will focus on language (linguistics and philology) and texts. The examination should normally be taken no later than autumn quarter of the third year.

Master of Arts, Japanese Language and Literature

Admission Requirements

- * A minimum undergraduate GPA of 3.00 in the junior and senior years
- * Three letters of recommendation and a statement of purpose
- * Strong undergraduate preparation in any of the following: Japanese language and literature, with the equivalent of at least four years' work in the language; another language and literature, Asian regional studies, comparative literature, linguistics, art history, English, philosophy, or history.
- * While a student lacking such preparation may be admitted, the student will be expected to concentrate initially on compensating for deficiencies in background by taking course work chosen in consultation with the academic adviser. In the case of inadequate training in Japanese, intensive courses in the language are available.

Degree Requirements

45-75 credits, as follows:

- * *Coursework:* The M.A. program requires a minimum of 45 credits above the 300 level which are to be earned through a combination of course work and research. At least 18 credits of coursework must be completed in numerically graded courses at the 400 and 500 level, and 18 credits at the 500 level and above.

The following courses normally constitute a minimal level of training: JAPAN 321, JAPAN 322, JAPAN 323 (5, 5, 5, no graduate credit); JAPAN 411, JAPAN 412, JAPAN 413 (5, 5, 5); JAPAN 431, JAPAN 422, JAPAN 423 (5, 5, 5); JAPAN 471, JAPAN 472, JAPAN 473 (5, 5, 5). Students whose undergraduate training has provided them with a background comparable to this may enter more advanced courses. Less well prepared students may require a program considerably in excess of the minimum 45 credits.

The student may present research in either of two ways: (1) by submitting a thesis, in which case the student takes at least 36 course credits and 9 thesis credits, or (2) by submitting two research papers that have been written either independently or for courses or seminars, in which case all 45 minimum credits will be in course credits.

- * *Foreign language requirement:* The student must fulfill one additional language requirement in addition to the language of specialization. The language can be either European or an Asian one; however, it should not be English. The language chosen must be relevant to the student's program of study, which is to say that the knowledge of it will provide him access to a body of critical literature on his field (as in the case of French or German) or will improve his grasp of the structure or etymological sources of Japanese (as in the case of Chinese or Korean). It may not be the student's native language.
- * *M.A. General Examination:* Near the end of study, the student takes two written examinations, each of two hours' duration, one in pre-modern (pre-Meiji) literature, and the other modern. These are intended to examine the student's general mastery of the respective areas.

Master of Arts, Japanese Language and Linguistics

Admission Requirements

- * A minimum undergraduate GPA of 3.00 in the junior and senior years
- * Three letters of recommendation and a statement of purpose
- * Strong undergraduate preparation in any of the following: Japanese language and literature, with the equivalent of at least four years' work in the language; another language and literature, Asian regional studies, comparative literature, linguistics, art history, English, philosophy, or history.
- * While a student lacking such preparation may be admitted, the student will be expected to concentrate initially on compensating for deficiencies in background by taking course work chosen in consultation with the academic adviser. In the case of inadequate training in Japanese, intensive courses in the language are available.

Degree Requirements

45-75 credits, as follows:

- * *Coursework:* The M.A. program requires a minimum of 45 credits above the 300 level which are to be earned through a combination of course work and research. At least 18 credits of course work must be completed in numerically graded courses at the 400 and 500 level, and 18 credits at the 500 level and above.

The following courses normally constitute a minimal level of training: JAPAN 421, JAPAN 422, JAPAN 423 (5, 5, 5, if language training is necessary); JAPAN 342 (5, no graduate credit); JAPAN 343 (5, no graduate credit); JAPAN 440 (5); JAPAN 442 (5); JAPAN 443 (5). Students whose undergraduate training has provided them with a background comparable to this may enter more advanced courses. Less well prepared students may require a program considerably in excess of the minimum of 45 credits.

The student may present research in either of two ways: 1) by submitting a thesis, in which case the student takes at least 36 course credits and 9 thesis credits (ASIAN 700), or 2) by submitting two research papers that have been written either independently or for courses or seminars, in which case all 45 minimum credits will be in course credits.

- * *Foreign language requirement:* The student must fulfill one additional language requirement in addition to the language specialization. The language can be either European or an Asian one; however, it should not be English. The language must be relevant to the student's program of study, which is to say that knowledge of it will provide him access to a body of critical literature on the student's field (as in the case of French or German) or will improve the student's grasp of the structure or etymological sources of Japanese (as in the case of Chinese or Korean). It may not be the student's native language.
- * *Linguistics:* Near the end of the course of study, each student takes two written examinations in Japanese linguistics, whether in descriptive linguistics, theoretical linguistics, applied linguistics, or sociolinguistics. These are intended to examine the student's general mastery of the respective areas.

Master of Arts, Korean

Admission Requirements

- * A minimum undergraduate GPA of 3.00 in the junior and senior years
- * Three letters of recommendation and a statement of purpose
- * Strong undergraduate preparation in any of the following: Korean language and literature, another language and literature, Asian regional studies, comparative literature, linguistics, English, philosophy, history or an approved area in the humanities or social sciences
- * Three years of Korean language training. Students lacking such preparation are required to take the necessary courses during their first year of residence.

Degree Requirements

39 credits, as follows:

- * *Coursework:* KOREAN 415, KOREAN 416, KOREAN 417 (5, 5, 5); ASIAN 498 (5) or KOREAN 462 (5); KOREAN 531 (5); KOREAN 532 (5);

ASIAN 700 (9). The student must also either 1) submit a thesis, or 2) submit two research papers in lieu of a thesis.

- * *Foreign language requirement:* The student must fulfill one additional language requirement in addition to the language of specialization. The language can be either European or an Asian one; however, it should not be English. The language chosen must be relevant to the student's program of study. It may not be the student's native language.
- * *M.A. examination:* The student must take a written examination in two parts, each part to be two hours in length. One part is in pre-modern Korean literature, the other modern. The student should take the M.A. examination no later than autumn quarter of the third year.

Master of Arts, South Asian Languages and Literature

Admission Requirements

- * Minimum undergraduate GPA of 3.00 in the last 90 quarter or 60 semester credit hours
- * Three letters of recommendation and a statement of purpose
- * Preference is given to students with prior preparation in a South Asian language and literature, in South Asian regional studies, or in a humanistic discipline pertinent to the study of South Asian civilization. Students lacking such preparation may be admitted to the M.A. program; however, they must remedy any deficiencies by adding, as early as possible, such courses as the academic adviser considers necessary. South Asian languages in which specializations are offered at the University are Sanskrit and Hindi.

Degree Requirements

45-75 credits, as follows:

- * Coursework:
 - o Non-thesis program: 45 course credits, 18 of which must be at the 500 level and above. Language study through the fourth-year level in the student's major language and through the second-year level in a second South Asian language. In addition, the student must present two seminar papers which are approved by the student's adviser and at least one other faculty member in the department.
 - o Thesis program: 45 course credits plus 9 thesis credits. At least 18 of the 45 credits must be taken at the 500 level or above. The language requirements in this program are the same as in the non-thesis program. In addition, the student must write an acceptable M.A. thesis according to the rules and policies of the Department of Asian Languages and Literature and pass an oral examination.
- * Foreign language requirements: Students must demonstrate competence in their major South Asian language, and must complete the course requirements in their second South Asian language as outlined above. In addition, students must demonstrate through a written examination reading knowledge of one foreign language relevant to their research, which must be other than English and the student's native language. At the M.A. level, this language may be the student's second South Asian language or a European language.

Doctor of Philosophy, Buddhist Studies

Admission Requirements

M.A. degree in Asian Languages and Literature at the University of Washington and a satisfactory evaluation by South Asian Language Program faculty. Students with sufficient background, usually the successful completion of a relevant M.A. degree at another institution, may be considered for admission into the Ph.D. program.

Degree Requirements

90 credits, as follows:

For the Ph.D., students are expected to demonstrate the ability to do original research utilizing primary languages of Buddhist traditions in accordance with their chosen areas of concentration. Students are required to demonstrate competence in their major Asian languages and pass written examinations in two research languages other than English and the student's native language (that is, one written examination in addition to the examination completed at the M.A. level). Where appropriate, students are strongly encouraged to acquire competence in a modern research language

in order to pursue research in the field: for example, in India, Nepal, Sri Lanka, Tibet, China, or Japan.

Students are also required to pass four written field examinations selected in accordance with the student's interests. Generally, at least two of these examinations are directly related to some aspect of Buddhist studies and a third falls within the general purview of South Asian languages and literature. A fourth field examination can have as its subject an adjacent field or discipline. Once these field examinations have been satisfactorily completed, the student is eligible to take a two-hour comprehensive oral examination, administered by the student's supervisory committee. When that has been passed, students are accorded candidate's status and are ready to submit a dissertation proposal. The Ph.D. is conferred once the completed dissertation has been defended successfully before the student's supervisory committee.

Doctor of Philosophy, Chinese

Admission Requirements

After successful completion of 45 credits (a minimum of three quarters) of graduate study in the department, a student wishing to enter the Ph.D. program with specialization in Chinese language and literature submits a formal petition to the Department stating post-M.A. academic plans and goals.

Ideally, the prospective candidate will have completed an M.A. degree in the field of Chinese language and literature prior to entering the Ph.D. program. If the student has an M.A. in another pertinent field, for example, in Linguistics, comparative literature, philosophy, history, or Asian regional studies, it is not necessary to take an additional M.A. in Chinese language and literature. The student, however, is required to satisfy all course and examination requirements for the M.A. program in this department. Upon admission to the program, the student should be prepared to take courses in modern Chinese at the 500 level, and should have at least two years of Classical Chinese.

A student who intends to go directly from the B.A. to the Ph.D. program must present an exceptionally strong background preparation in the disciplines of literary study or linguistics. The student is expected in the course of his or her work to satisfy all curriculum requirements for the M.A., and must petition the department for special permission to bypass the M.A.

Degree Requirements

90 credits, as follows:

- * *Course requirements:* Students in the Ph.D. program must complete the course requirements for the M.A. in Chinese. Equivalent courses from other programs may be substituted subject to written approval by the regular instructor of the course in question. In addition, whichever quarters of the sequence CHIN 461, CHIN 462, CHIN 463 were not taken for the M.A. must be taken for the Ph.D. The student's post-M.A. course work should be designed, in consultation with the adviser, to fill in gaps or strengthen weaknesses in the student's background, and to establish and develop four fields of special study that the student pursues in some depth in preparation for the general examination.
- * *Field requirements:* The student is expected to familiarize himself or herself with both the original texts and the secondary scholarship of the field, and to show some potential for carrying out original research in the area or field in question. Each student must pursue four such fields of special study, and is examined separately by an appropriate faculty member prior to the general oral examination. The field examinations must be written.

The four fields that a student elects to study must, in the aggregate, reflect both of the primary components of the department's graduate-level offerings, i.e., language (linguistics and philology) and literature. Students are encouraged in connection with at least one field to incorporate to a significant extent some aspect of Chinese history and culture, exclusive of strictly literary or linguistic facets thereof. With permission of his or her adviser a student may offer one field from outside the Department, for example, in general linguistics, literary criticism, a non-Chinese literature, Chinese philosophy or religion, or a particular period of Chinese history. Such a field must be demonstrably related in a significant way to the student's overall course of study.

- * *Examinations:* The student is examined in each of the four fields separately by an appropriate faculty member. Prior to the General

Examination the student must demonstrate a reading knowledge of an additional Asian language and a pertinent European language. (The student may apply the foreign language reading examination required for the M.A. to this requirement.)

Doctor of Philosophy, Japanese

Admission Requirements

Aside from having to complete at least two quarters of graduate study in the department, the student petitioning for admission to pre-candidacy status in the Ph.D. program must either hold the M.A. degree in Japanese language and literature or must have completed a minimum of 45 course credits and have satisfied the language requirement for the M.A. The student should also be taking at least 500-level courses in modern Japanese and should have studied classical Japanese for a minimum of one year. Any insufficiencies in background (e.g., in the case of a student holding an M.A. in an area other than Japanese language and literature) should be made up before the student petitions for admission to pre-candidacy. The petition indicates that the student feels he or she is prepared to take a written examination on the student's general knowledge of the field and an additional oral diagnostic examination on his or her background and plans for future study. The petition should only be submitted after consultation with the academic adviser.

Degree Requirements

95 credits, as follows:

- * *Course requirements:* In addition to the minimum of 45 credits or its equivalent required for the master's program, the student must take at least 50 credits of course work on the graduate level. The following courses and dissertation credits are required: JAPAN 501 (5); JAPAN 505, JAPAN 506, JAPAN 507 (5, 5, 5); JAPAN 531, JAPAN 532, JAPAN 533 (5, 5, 5); JAPAN 571, JAPAN 572, JAPAN 573 (5, 5, 5); JAPAN 590 (15); ASIAN 800 (27)

Additional course work in related fields may be required to meet the needs of each program. In order to acquire the widest possible background, students are encouraged to take related courses in history, linguistics, religion, and the social sciences. Familiarity with Chinese literature and allied fields as well as with comparative literature is strongly recommended. Each student develops an individualized program of studies in consultation with the academic adviser.

- * *Language examinations:* In addition to a second language (usually European) required for the M.A., the student must demonstrate proficiency in a third language, usually Asian (Chinese is the usual choice for an Asian language, but the student should discuss other possibilities with the adviser). Proficiency must be demonstrated in the third language before the student may proceed to the General Examination.
- * *Field examination:* Upon becoming a precandidate, the student has completed a generalized study of the area of Japanese language and literature, and should choose four specialized fields to study for the next one or two years under the guidance of the Supervisory Committee. The four fields must be sufficiently diverse, and at least one of them must be in language. As the supervisor for each field becomes satisfied that the student has attained sufficient mastery, the supervisor and the student decide on a time for the student to take a written examination.
- * *General examination:* When the four field examinations and the third language requirement have been satisfied, the academic adviser arranges with the Graduate School for the student to take the oral General Examination for admission to candidacy for the doctoral degree.
- * *Dissertation and final examination:* After achieving candidate status, the student engages in research and the writing of the dissertation. When the Reading Committee has accepted the dissertation, the Dean of the Graduate School authorizes the Supervisory Committee to hold the Final Examination in defense of the dissertation, which completes the degree requirements for this program.

Doctor of Philosophy, Korean

Admission Requirements

A student shall petition for admission to the Ph.D. program with specialization in Korean literature after successful completion of at least two quarters

of graduate study in the Department of Asian Languages and Literature. The student should either have the M.A. degree in Korean literature or the equivalent, or have satisfactorily completed all coursework required for the M.A. in Korean literature. The student should be prepared to take 500-level courses in Korean. The petition should be submitted after consultation with the student's academic advisor.

Degree Requirements

90 credits, as follows:

- * *Coursework:*
 - o *Korean language and literature:* In addition to the course requirement and examination for the M.A. in Korean literature, students in the Ph.D. program must complete the following courses: KOREAN 531 (5), KOREAN 532 (5), ASIAN 800 (27)
 - o *Chinese language and literature:* Students interested in pre-modern Korean literature are required to take two years of Chinese, at least one year of classical Chinese, and a survey course on pre-modern Chinese literature. Students interested in modern Korean literature are required to take either: (1) three years of Chinese and a survey course in Chinese literature, or (2) three years of Japanese and a survey course in modern Japanese literature.
 - o *Linguistics:* Students are encouraged to take linguistics courses that help the student prepare for the field exam in a language-related area. Courses to choose from include the following: ASIAN 401 (5), JAPAN 440 Linguistics (5).
 - o *Interdepartmental:* Students are encouraged to take Korea-related courses in other disciplines such as history and anthropology. Familiarity with other literatures and cultures, and course work in other departments such as Comparative Literature or other language and literature programs is also recommended.
- * *Field examinations:* With the guidance of an adviser, students develop a plan of study that concentrates on four areas of study, or "fields". A student may offer no more than one Korea-related field from outside the department; three of the fields must be prepared with department faculty. One of the fields may be in another Asian language or literature, depending on the student's interests. At least one of the fields shall be related to language.
- * *Language examinations:* Prior to the General Examination, students must demonstrate proficiency of an additional Asian language and a European language. (The student may apply the foreign language required for the M.A. to this requirement.)
- * *General examination, dissertation, final examination:* When the four field examinations have been successfully passed, and the second language requirement met, the academic adviser arranges with the Graduate School for the student to take the oral General Examination for admission to candidacy for the Doctoral degree. This is usually a two-hour long oral examination, and covers principally, but not exclusively, the four fields that the student has prepared. Passing this examination, the student then writes a dissertation, under the direction of a dissertation adviser. An oral Final Examination in defense of the finished dissertation completes the degree requirements for this program.

Doctor of Philosophy, South Asian Languages and Literature

Admission Requirements

Normally, entry into the program is contingent upon successful completion of the M.A. degree in Asian Languages and Literature at the University of Washington and a satisfactory evaluation by South Asian Language Program faculty. Students with sufficient background, usually the successful completion of a relevant M.A. degree at another institution, may be considered for admission into the Ph.D. program.

Degree Requirements

90 credits, as follows:

For the Ph.D., students are required to demonstrate competence in their major South Asian language and pass written examinations in two research languages other than English and the student's native language (that is, one written examination in addition to the examination completed at the M.A. level). One of these two research languages must be a European language.

Students are also required to pass four written field examinations, at least three of which must fall within the general purview of South Asian languages and literature. A fourth can have as its subject an adjacent field or discipline, of the candidate so chooses--an aspect of South Asian history or art history, for example. Once these field examinations have been satisfactorily completed, the student is eligible to take a two hour comprehensive oral examination, administered by his or her supervisory committee. When that has been passed, students are accorded candidate's status and are ready to submit a dissertation proposal. The Ph.D. is conferred once the completed dissertation has been defended before the student's supervisory committee.

Financial Aid

Financial aid for graduate students newly entering the department is very limited and is awarded on a competitive basis. National Resource Fellowships are awarded for the study of Chinese, Japanese, and Korean. The department offers incoming graduate students limited opportunities for teaching assistant positions in Chinese, Japanese, and Korean. Since some financial aid is wholly or partially determined by need, all prospective students are urged to submit the Free Application for Federal Student Aid (FAFSA) with the College Scholarship Service in New Jersey, and to apply for other forms of aid mentioned in the department's cover letter to prospective students.

Course Descriptions

See page 293.

Astronomy

C319 Physics-Astronomy Building

Modern research in astronomy and astrophysics encompasses a large number of disciplines and specialties. Research areas include planetary astronomy, stellar structure and evolution, interstellar matter, x-ray sources, galactic structure, extragalactic astronomy, galactic dynamics, quasars and galactic nuclei, and theoretical and observational cosmology.

Undergraduate Program

Adviser
C311 Physics-Astronomy, Box 351580
206-543-1988
office@astro.washington.edu

The Department of Astronomy offers the following undergraduate programs:

- * The Bachelor of Science degree with a major in astronomy

Bachelor of Science

Suggested First-Year Courses: MATH 124, MATH 125, MATH 126; MATH 308, MATH 324; PHYS 121, PHYS 122, PHYS 123. At community colleges it is better to take courses in physics, chemistry, mathematics, and computer science than the usual introductory astronomy courses.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

89 credits as follows:

1. ASTR 321, ASTR 322, ASTR 323
2. 9 credits of astronomy 400-level courses (with at least 3 credits in 480 or 499)
3. PHYS 121, PHYS 122, PHYS 123; PHYS 224, PHYS 225, PHYS 227, PHYS 228; PHYS 321, PHYS 322, PHYS 334
4. MATH 124, MATH 125, MATH 126; MATH 308, MATH 324
5. 12 additional credits in courses at the 300 level or above in physics (chosen from PHYS 315, PHYS 323, PHYS 324, PHYS 328, PHYS 331, PHYS 335, PHYS 421, PHYS 422, PHYS 423, PHYS 424, PHYS 425, PHYS 426, PHYS 431, PHYS 432, PHYS 433, PHYS 434) or engineering as approved by adviser. Data analysis (ASTR 480) and senior-year

research (ASTR 499) are highly recommended, especially for students planning graduate work.

6. No grade lower than 2.0 is acceptable in courses fulfilling the above requirements.
7. Undergraduates interested in advanced work in astronomy are advised to take a double major in astronomy and physics. Undergraduates interested in immediate employment at an observatory or other scientific institution should include computing and electronics courses as part of their program.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:*With this degree, students obtain a knowledge of the components of the universe, an understanding of the physics of its structure, and the technical skills to obtain and analyze data from telescopes. Graduates go on to graduate school or work at observatories or in industrial applications (lasers, x-ray, optical imaging) or in teaching applications.

* *Instructional and Research Facilities:*The department operates a 30-inch telescope with modern instrumentation at the Manastash Ridge Observatory near Ellensburg primarily for students. The department is also part of a consortium of universities that operate a 3.5-meter optical/infrared telescope located on Sacramento Peak, New Mexico, and is a partner in the innovative Sloan Digital Sky Survey. Students also have access to a variety of national facilities, such as the Kitt Peak and Cerro Tololo observatories and the Very Large Array. A variety of research is conducted with satellite instruments such as the Hubble Space Telescope. Data analysis and theoretical research are conducted on the department's cluster of computers, and on a variety of UW and national supercomputer facilities. Undergraduate majors often assist faculty members in acquisition, reduction, and interpretation of data.

* *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* Space Grant

* *Department Scholarships:* Baer Prize. See adviser for details.

* *Student Organizations/Associations:* The Society of Physics Students. Undergraduate Astronomy Institute. See adviser for details.

*Of Special Note:*The first required astronomy course, ASTR 321, must be preceded by at least one year of college physics and mathematics. Any lower-division astronomy courses count as electives and not as part of the major. To finish in four years, the student must have completed PHYS 123 before autumn quarter of the junior year.

Graduate Program

Graduate Program Coordinator
C304 Physics-Astronomy, Box 351580
206-685-2392
office@astro.washington.edu

A series of graduate courses in solar system, stellar, galactic, and extragalactic astrophysics is offered. The heart of the graduate program is the collaboration of students and faculty members in research at the frontiers of astronomy. Students work collaboratively with members of the faculty to develop the techniques and insight necessary for successful research, and, subsequently, to define a thesis topic. The student's thesis research may be purely theoretical or use observational material (obtained through the facilities of either the University of Washington or one of the national observatories) or a combination. Active research programs are being carried out in the areas of stellar interiors, stellar atmospheres, planetary atmospheres and surfaces, x-ray sources, interplanetary dust, interacting binary stars, extragalactic astronomy, gravitation, interstellar matter, dark matter, cosmology, relativistic astrophysics, and computational astrophysics.

Doctor of Philosophy

Admission Requirements

Most, though not all, entering students have a bachelor's degree in physics. Entering students are not required to have a background in astronomy, although some knowledge of general astronomy is expected of those to whom a teaching assistantship is to be offered. Undergraduates interested in a graduate program in astronomy are urged to concentrate on prepara-

tion in physics and mathematics before entering.

- * Application for Graduate Admission (AGA) form of the UW Graduate School
- * Application fee
- * A copy of the AGA to the Astronomy Department
- * "Statement of Goals and Achievements." This one-page, typed essay must address the reasons why the applicant wishes to pursue a graduate program in astronomy.
- * Transcripts from all previous colleges and academic programs
- * Graduate Record Examination (GRE) scores, both general and in the physics subject test, sent from the testing service
- * Three letters of recommendation on the appropriate forms and sent directly to the department before the application deadline by the recommender.
- * For international applicants:
 - o A second set of transcripts from all previous colleges and academic programs
 - o A paper copy of the AGA mailed to the Graduate School;
 - o TOEFL score report
 - o UW Statement of Financial Ability
 - o Test of Spoken English (TSE) scores, sent by the testing service

Degree Requirements

90 credits minimum, as follows:

Typically, students take courses during their first two to three years at the UW while at the same time sampling research projects with various faculty. The department offers a full set of graduate astronomy courses covering every major research area in astrophysics. The areas covered include planetary astronomy, stellar interiors and atmospheres, interstellar medium, galaxies, dynamics, cosmology, physical processes, observational astronomy, and a variety of special topics. Right from their first year students are encouraged to embark on faculty-supervised research programs so that they will make informed decisions about a thesis topic and a professional research career.

Core Curriculum: Students may take either core courses with an emphasis in stellar astronomy or core courses with an emphasis in galactic and intergalactic astronomy. Either emphasis should be completed in the first two or three years of study:

- * *Stellar astronomy emphasis:* ASTR 507 (3), ASTR 519 (3), ASTR 521 (3), ASTR 522 (3), ASTR 531 (4), ASTR 532 (3), ASTR 557 (3), ASTR 561 (3)
- * *Galactic and intergalactic astronomy emphasis:* ASTR 508 (3), ASTR 509 (3), ASTR 511 (3), ASTR 512 (3), ASTR 513 (3), ASTR 541 (3)

Students must pass two examinations, the Qualifying Exam and the General Exam, before being admitted to Ph.D. candidacy. The Qualifying Exam, which is a written exam covering general knowledge, must be passed by the end of the third year of matriculation. The General Exam is a 40-minute oral exam on a topic related to a student's proposed Ph.D. research topic. Students embark on their Ph.D. research program after passing the General Exam, typically in their third or fourth year at U.W. Most students complete their PhD thesis two to three years later.

A Master of Science degree is offered. The requirements for a master's degree are either (1) adequate performance on the Qualifying Exam or (2) an approved and supervised master's thesis. Students must present a minimum of 36 credits for the Master of Science degree

Assistantships

Normally all students making satisfactory academic progress receive financial support. More than three-quarters of the department's graduate students hold fellowships or research assistantships. A number of teaching assistantships are available, primarily in the elementary astronomy courses.

Course Descriptions

See page 301.

Atmospheric Sciences

402 Atmospheric Sciences-Geophysics Building

Atmospheric Sciences is a wide-ranging discipline that includes topics as diverse as weather forecasting, global warming, air quality, Pacific Northwest weather and climate, mountain weather, marine weather, El Niño, the ozone hole, ice ages, and the weather of Mars. It considers problems that are both scientifically challenging and critical for the welfare of modern society. These problems are addressed with theory, measurements, and computer simulations.

Undergraduate Program

Adviser
402 Atmospheric Sciences-Geophysics Building, Box 351640
206-543-4576
advise@atmos.washington.edu

The Department of Atmospheric Sciences offers the following programs of study:

- * The Bachelor of Science degree with a major in atmospheric sciences
- * A minor in atmospheric sciences

Bachelor of Science

Suggested First- and Second-Year Courses: CHEM 142; CSE/ENGR 142

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

74 credits as follows:

1. *Core requirements:* MATH 124, MATH 125, MATH 126; MATH 324; PHYS 121, PHYS 122, PHYS 123; AMATH 301, AMATH 351, AMATH 353; CSE 142; ATM S 301, ATM S 321, ATM S 340, ATM S 358, ATM S 370, ATM S 431, ATM S 441
2. *Area of specialization:* 19 credits of additional coursework at the 200 level or above, selected in consultation with the faculty adviser. Suggested options include meteorology, atmosphere and environment, atmosphere and ocean, and teacher education.
3. A grade of 2.0 or better in each of the required courses and an overall GPA in these courses of 2.50.

Pregraduate Program for Physical Science, Mathematics, and Engineering Majors

The following elective course sequence is suitable preparation for students interested in pursuing graduate study in atmospheric sciences: ATM S 301, ATM S 340, ATM S 441.

Minor

Minor Requirements: 25 credits to include ATM S 301 plus other approved courses. The minor may include a maximum of 6 independent study credits. Prerequisites include MATH 126 or MATH 136, and PHYS 123. Some courses may require further math or chemistry experience.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The degree program qualifies students for professional employment in weather forecasting, air-quality control and monitoring, and other areas of atmospheric sciences and related fields. The baccalaureate degree also is appropriate preparation for graduate study in atmospheric sciences.
- * *Instructional and Research Facilities:* Extensive computer resources are available in the Departmental Computer Laboratory. The Department also maintains a map room for viewing weather data in either print or electronic format. A study area is provided for undergraduates. An instrument laboratory is maintained with a wide range of observing and data collection systems. Students also have access to a machine shop, several electronic laboratories and an extensive weather data archive.

- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Internships are available either within the department or with outside organizations, providing a valuable opportunity to test a student's interests in various meteorological career paths and to extend the student's knowledge. A limited number of departmental scholarships are available each year, based on academic excellence or financial need. Employment opportunities are often available in one of the many departmental research groups, and some internships are paid.

Students majoring in atmospheric sciences may take advantage of a variety of opportunities to enhance their education. Undergraduate students are welcome at the department's many seminars and colloquia and are encouraged to join in the annual forecast contest. They may work on independent research projects under the guidance of a faculty member, or be an active participant in a field program.
- * *Department Scholarships:* The Bruce Caldwell Memorial Scholarship and the Anonymous Donor Atmospheric Sciences Scholarship, which are both awarded annually, based on both academic excellence and financial need.
- * *Student Organizations/Associations:* Student Chapter of American Meteorological Society, Puget Sound American Meteorological Society Chapter, Weekly Weather Discussion for all majors.

Of Special Note: The first required atmospheric sciences course is ATM S 301, which is offered autumn quarter only. Any lower-division atmospheric sciences courses will count as electives and not as part of the major.

Graduate Program

Graduate Program Coordinator
402 Atmospheric Sciences-Geophysics, Box 351640
206-543-4576
advise@atmos.washington.edu

Rapid growth of research in atmospheric sciences began in the late 1940s in response to needs and opportunities in weather forecasting. Extensive research is now underway to extend the time scale over which useful forecasts can be made and to increase the amount of regional and temporal detail in short-range forecasts. In addition, the atmospheric sciences now address a broad range of other problems of fundamental interest and importance. Examples include changes in climate that could result from increases in atmospheric CO₂ and other greenhouse gases, and the application of remote-sensing techniques to the monitoring and understanding of weather and climate.

Graduate students in the atmospheric sciences come from a variety of disciplines: physics, chemistry, engineering, atmospheric, or geophysical sciences, and applied mathematics. Opportunities are broad enough that each of these backgrounds is valuable for specific subfields within the atmospheric sciences. However, students of atmospheric sciences should have in common a sound background in the fundamentals of physics and applied mathematics and an interest in complex natural phenomena. Research projects and graduate courses in the Department of Atmospheric Sciences are closely related, and the well-prepared graduate student may expect to begin research work rather quickly.

Master of Science

Admission Requirements

- * Complete Graduate School application (a copy must be sent to the department)
- * Official copy of transcripts
- * Assistantship and Fellowship Application
- * Statement of interests, a one-page, typed essay must address the reasons why the student wishes to pursue a graduate program in Atmospheric Sciences.
- * GRE General Examination scores sent from the Educational Testing Service
- * Three letters of recommendation on the appropriate forms sent directly to the department by the evaluators
- * For international applicants: TOEFL scores, sent by the testing service
- * *Deadline:* January 15. Autumn quarter is the only quarter for which the department accepts applications.

Degree Requirements

Core classes (25-28 credits): ATM S 501 (5), ATM S 502 (3), ATM S 535 (3), ATM S 532 (3), ATM S 558 (3). One of the following sequences: ATM S 505 (4), ATM S 509 (4), ATM S 542 (3); or ATM S 503 (3), ATM S 504 (5)

The two-course dynamics sequence (ATM S 503, ATM S 504) is intended for those whose research specialty will be well outside the realm of dynamic meteorology. Most students are encouraged to take the three-course sequence in dynamics (ATM S 505, ATM S 509, ATM S 542).

Master's students need 36 credits to graduate (excluding seminars and colloquia). 27 of the credits presented must be from the core classes with 24 of those credits in Atmospheric Sciences courses. The remaining 9 credits should be in the form of ATM S 700, Master's Thesis. However, those students intending to pursue a Ph.D should take all of the courses required above.

Doctor of Philosophy

Admission Requirements

All students admitted into the Atmospheric Sciences graduate program are admitted initially to the M.S. track of study. Students in the M.S. track who seek entry into the Ph.D. program will be evaluated by the departmental Committee on Graduate Studies.

A student who wishes to be considered by the committee must first write a letter to the Academic Counselor and also to the student's M.S. committee, requesting admission into the Ph.D. program, and choosing one of the three following evaluation options:

- * A student entering the department, having already earned an M.S. degree in the atmospheric sciences or a closely related discipline, may submit his or her M.S. thesis for evaluation in the first week of the autumn quarter of the student's second academic year in the department.
- * A student may submit a draft of his or her University of Washington Department of Atmospheric Sciences M.S. thesis approved by the M.S. supervisory committee for evaluation.
- * A student may submit for evaluation the manuscript of a peer-reviewed journal article on which the student is lead author.

Degree Requirements

- * Coursework:
 - o ATM S 501 (5), ATM S 502 (3)
 - o ATM S 505 (4), ATM S 509 (4) (Students whose anticipated research has minimal connection with atmospheric dynamics, such as those involved in laboratory or field work in atmospheric chemistry or cloud microphysics, may take ATM S 503 and 504 in place of ATM S 505 and 509. Please see the Graduate Program Coordinator before enrolling in ATM S 503.)
 - o Either ATM S 532 (3) or ATM S 558 (3)
 - o ATM S 535 (3), ATM S 542 (3)
 - o One of the following must be taken each quarter that coursework is taken: ATM S 520 (1), either ATM S 521 (1) or ATM S 524 (1), or ATM S 600 (up to 10 credits each quarter)
 - o Electives: Students should take an appropriate number of elective courses in their areas of interest, as determined in consultation with adviser
 - o Applied math: either AMATH 401 (4) or AMATH 567 (5); either AMATH 402 (4) or AMATH 568 (5)
 - o ATM S 700 (10 credits each quarter, beginning the second year of the program)
- * General Examination
- * Dissertation
- * Final Examination

Assistantships

Nearly all graduate students are supported by either research assistantships or fellowships. Students are usually a teaching assistant during at least one quarter, in the second year of study. Students are supported full-time during the summer.

Course Descriptions

See page 302.

Biochemistry

109 Bagley

Biochemistry is the study of the living organism at the molecular level. It draws on the techniques of analytical, organic, inorganic, and physical chemistry in determining the molecular basis of vital processes.

Undergraduate Program

Adviser

109 Bagley, Box 351700
206-616-9880, 206-543-9343
advisers@chem.washington.edu

The Biochemistry Program offers the following programs of study:

- * The Bachelor of Science degree with a major in biochemistry

Bachelor of Science

Suggested First and Second-Year Courses: BIOL 180, BIOL 200 (or BIOL 201, BIOL 202); CHEM 142, CHEM 152, CHEM 162, CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242; MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116 with one physics lab course strongly recommended).

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

106 credits as follows:

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136)
2. PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116), with the PHYS 121 sequence recommended
3. CHEM 142, CHEM 152, CHEM 162, (or CHEM 145, CHEM 155, CHEM 165); CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346, CHEM 347); CHEM 452, CHEM 453 (or CHEM 455, CHEM 456, CHEM 457 or CHEM 475, CHEM 476, CHEM 477)
4. BIOL 180, BIOL 200 (or BIOL 201, BIOL 202)
5. GENOME 371
6. BIOC 426, BIOC 440, BIOC 441, BIOC 442
7. 11 credits chosen from a current department list (available in 109 Bagley) of upper-division science classes including math, biology, microbiology, chemistry, genome sciences, zoology. Up to 9 credits of approved advanced-level undergraduate research may also be applied to this requirement.
8. A minimum 2.80 GPA is required for all chemistry, biology, and biochemistry courses counted toward the major; a minimum 2.0 grade is required for all chemistry, biology, and biochemistry courses counted toward the major. A minimum 2.50 GPA is required for the BIOC 440, BIOC 441, and BIOC 442 sequence.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* At the conclusion of their studies, graduating biochemistry majors should possess a general working knowledge of the basic areas of biochemistry; be proficient in basic laboratory skills; have the ability to carry out strategies for solving scientific problems; have an understanding of the principles and applications of modern instrumentation, computation, experimental design, and data analysis; have had the opportunity to gain experience with a research project; have the ability to communicate scientific information clearly and precisely; have the ability to read, understand, and use scientific literature; have an awareness of the broader implications of biochemical processes; have had the opportunity to work as part of a team to solve scientific problems; and have had an introduction to opportunities in, and requirements for, the careers available to biochemistry majors.

Students planning a career in biomedical research, the health professions, or biotechnology find the biochemistry degree to be an excellent choice. The degree is also good preparation for graduate school in any aspect of biochemical or biomedical research.

- * *Instructional and Research Facilities:* Research facilities for the department are housed in the Biochemistry-Genetics Building, which provides approximately 52,000 square feet of research space, conference rooms, and a departmental library. In the immediate vicinity are the departments of Immunology, Genome Sciences, Microbiology, and Pharmacology, as well as programs in biomolecular structure, molecular medicine, neurobiology and molecular and cellular biology, with which the department has common research interests. The laboratories are equipped with modern research equipment and are supported by external, centralized research facilities. An emphasis on biomedical research is facilitated by the location of the department within the School of Medicine.

- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

- * *Research, Internships, and Service Learning:* No formal internship program. Students are encouraged to pursue national and regional internships. See advisers for more information.

- * *Department Scholarships:* Resident tuition scholarships and book prizes are awarded annually by the Department of Chemistry to eligible chemistry and biochemistry majors. Applications are available during the month of March for the following academic year. See department advisers for more information.

- * *Student Organizations/Associations:*

- o Alpha Chi Sigma: the UW affiliate of the national chemistry-related science organization for chemistry and biochemistry majors
- o Phi Lambda Upsilon: the UW affiliate of the national chemistry honorary society
- o The Free Radicals: a general undergraduate club for chemistry and biochemistry majors.

Of Special Note:

- * This degree requires a minimum of 196 credits.
- * Students are strongly encouraged to participate in undergraduate research.

Course Descriptions

See page 548.

Biology

106 Kincaid

Biology is the broadly based study of living organisms and has become an increasingly dynamic and wide-ranging discipline. It may be approached by focus on cell and molecular processes, development, organismal physiology and morphology, natural history, evolution, conservation, or ecology. The aim is to elucidate general principles applicable to many different sorts of organisms rather than to concentrate on any particular taxonomic group. Biology is often interdisciplinary in nature and may involve aspects of biochemistry, botany, genetics, microbiology, zoology, and many other natural sciences.

Undergraduate Program

Adviser

318 Hitchcock, Box 355320
206-543-9120
bioladv@u.washington.edu

The Department of Biology offers the following programs of study:

- * The Bachelor of Arts degree with a major in biology.
- * The Bachelor of Science degree with a major in biology. Students choose one of the following options: ecology and evolution; environmental and conservation; general; molecular, cellular, and development; physiology; and plant.

Designed for students desiring breadth of training, the Bachelor of Arts program does not require physics. Students do not select an emphasis, and hence have greater flexibility in upper division biology electives. An ideal degree for students wishing to double major in arts or humanities and in biology or who wish to design their own degree program.

The Bachelor of Science options are as follows:

1. *Ecology and Evolution.* Emphasizes ecological and evolutionary processes and relationships of those processes to systematics and biogeography of organisms. For students who wish to pursue graduate studies or seek employment in the fields of theoretical and applied ecology, evolution, systematics and biogeography, and mathematical biology.
2. *Environmental and Conservation.* Addresses conservation and restoration aspects of species, populations, and ecosystems, as well as related areas of law and environmental policy. While this is the most interdisciplinary program, it does require the same supporting and foundation courses in science as the other options.
3. *General.* Emphasizes breadth of training in biology. This is the most flexible program and offers a greater variety of advanced electives than other options. Attractive to students desiring K-12 teaching credentials or who otherwise wish to tailor their degree to their needs.
4. *Molecular, Cellular, and Development.* Designed for students who wish to pursue graduate studies in genetics, biochemistry, microbiology, cell biology, or developmental biology, as well as for candidates for professional schools such as medicine and dentistry.
5. *Physiology.* Emphasizes physiological processes from the cellular to the organismal levels, and across all groups of organisms. An attractive option for students interested in graduate and professional fields in animal and human physiology, medicine, and veterinary sciences.
6. *Plant.* Offers students both breadth and depth of training in the field of botany. Ideal for students desiring to enter graduate programs in botany or for those wishing to pursue careers in the plant biology or horticultural fields in state and federal agencies.

Each of the above bachelor's degree programs in the biological sciences can be combined with Washington State requirements to prepare students to teach biology in public schools at the secondary level. See the Biology Teaching Program adviser for specific requirements.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Same as for the Bachelor of Science degree as described below, except no physics is required.

Department Admission Requirements

Same as for the Bachelor of Science degree as described below.

Major Requirements

90 credits as follows:

1. Introductory biology, three to six quarters of chemistry, and mathematics are the same as required by the B.S., listed below. However, physics is not required and the remaining 36 upper division elective credits may be chosen from any biology course or any courses on the electives lists from the six options for the BS degree.
2. Additional Degree Requirements.
 - a. A minimum of 15 credits of 400-level biology electives must be taken at the UW.
 - b. Minimum GPA requirements are the same as for a B.S.

Bachelor of Science

Suggested First- and Second-Year Courses: Students should concentrate on general chemistry and mathematics the first year, biology and organic chemistry the second year (see major requirements for specific courses). Transfer students: complete an entire sequence at one school if possible. It is not necessary, or even desirable, to complete the Areas of Knowledge requirement during the first two years.

Department Admission Requirements

BIOL 180 or BIOL 201 with a minimum grade of 2.5; or BIOL 180, BIOL 200, BIOL 220 (or BIOL 201, BIOL 202, BIOL 203) with a cumulative GPA of 2.00 for the three courses. CHEM 142, CHEM 152, or equivalent. A minimum cumulative GPA of 2.00 is required for all courses which would apply toward major requirements (this includes all applicable chemistry, physics,

mathematics, quantitative science, and introductory biological science courses).

Major Requirements

90 credits as follows:

1. For all options the following basic coursework is required:
 - a. A one year sequence of introductory biology for majors (BIOL 180, BIOL 200, BIOL 220)
 - b. Three to six quarters of chemistry, covering general and organic chemistry: CHEM 120, CHEM 220, and CHEM 221; or CHEM 142, CHEM 152, CHEM 223, and CHEM 224; or CHEM 142, CHEM 152, CHEM 162* and CHEM 237, CHEM 238, and CHEM 239
 - c. Two quarters of mathematics (calculus or statistics): MATH 124 and MATH 125, or MATH 144 and MATH 145, or Q SCI 291 and Q SCI 292, or Q SCI 381 (or STAT 311) and Q SCI 482
 - d. Two quarters of physics: PHYS 114 and PHYS 115, or PHYS 121 and PHYS 122
 - e. GENOME 371
 - f. Natural history/biodiversity: one course selected from approved list (3 credits)
 - g. Option requirement: 300- and 400-level courses selected from lists specific to each option. See department web site for additional information. (34 credits)

*CHEM 162 is not required for this degree; however, CHEM 237, CHEM 238, and CHEM 239 are required by many professional programs and graduate schools, and the sequence does require CHEM 162.

2. Additional Degree Requirements:

- a. A minimum GPA of 2.00 for all UW courses applied toward major requirements, including required supporting courses, introductory biology, and upper division coursework. (A grade of 2.0 is not required in individual courses.)
- b. A minimum of 15 credits of 400-level biology electives must be taken at the UW.
- c. Two 300- or 400-level laboratory courses

Because of the differing specific requirements and choices for each option, it is extremely important for students to work closely with the Biology departmental advisers to insure completion of these 22-25 credits.

Student Outcomes and Opportunities

* **Learning Objectives and Expected Outcomes:** The department graduates between 350 and 400 students each year. Biology degrees are applicable to many different fields, depending upon student interests. Students in the program gain analytical and laboratory skills that prepare them for entry-level positions in a variety of biologically related areas, including, but not limited to, biotechnology, laboratory and/or field research support, health science support, wildlife biology, and ecology and conservation work with a variety of agencies, consulting firms, and research organizations in the northwest. Students may enter graduate programs that focus on some aspect of biological science (such as genetics, microbiology, immunology, ecology, environmental health, or cell and molecular biology), or enter a variety of professional programs, such as veterinary medicine, medicine, dentistry, pharmacy, laboratory medicine, nursing, and others.

* **Instructional and Research Facilities:** The Department of Biology occupies 128,000 square feet in Hitchcock, Johnson, and Kincaid Halls. Extensive research laboratories, teaching laboratories, computer workstations, and support services are found throughout the department.

Specialized facilities include more than 16,000 square feet of greenhouse, seawater facilities, growth rooms, electron microscopes, and other specialized equipment. Undergraduates have access to most of these facilities, especially those engaged in undergraduate research.

Off campus, the internationally recognized Marine Research Station, Friday Harbor Laboratories, provides many opportunities for undergraduates, from courses to research apprenticeships.

* **Honors Options Available:** With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* **Research, Internships, and Service Learning:** Biology faculty welcome undergraduates into their research programs, often working closely with them. Approximately 40% of the 900 undergraduate Biology majors finish with undergraduate research experience.

UW proximity to such Seattle area organizations as the Fred Hutchinson Cancer Research Center, Swedish Hospital, numerous biotech companies, NOAA, National Marine Fisheries Research Center, the Seattle Aquarium, and the Woodland Park Zoo, as well as the close ties of Biology faculty to Friday Harbor Laboratories, the faculty in the College of Forest Resources, and the College of Ocean and Fishery Sciences provide opportunities for biology majors to develop internships within these organizations. See adviser for ways to get credit for such experiences.

- * Department Scholarships: Several scholarships are available, in a few cases to biology majors only. Most of these support students wishing to pursue an undergraduate research experience. They are competitive, sometimes highly so. They include:
 - o Howard Hughes Undergraduate Research Internship: approximately 20 per year for freshmen and 20 per year for juniors and seniors.
 - o Friday Harbor Laboratory (FHL) Apprenticeships: \$3,000 for one quarter, spring or autumn.
 - o Mary Gates Scholarships: very competitive, across all science disciplines.
 - o Herschel and Caryl Roman Scholarship: \$2,500-5,000 annually to one or two students who have an interest in genetics research.
 - o Porath/Johnson Endowed Scholarship: one-year, \$5,000 scholarship to an outstanding biology major.
 - o For qualifications, deadlines, and other details, see adviser or consult the Department of Biology Web site.
- * Student Organizations/Associations: Beta Beta Beta Biology Honor Society, tribeta@u.washington.edu; Pre Med Society (Alpha Epsilon Delta), aed@u.washington.edu.

Course Descriptions

See page 304.

Chemistry

109 Bagley

Chemistry is a branch of natural science that deals principally with the properties of molecules, the chemical reactions that occur between them, and the natural laws that describe molecular interactions. Chemistry is a central science, having strong interactions with biology, medicine, earth and environmental sciences, physics, and mathematics.

Undergraduate Program

Adviser
109 Bagley, Box 351700
206-616-9880, 206-543-9343
advisers@chem.washington.edu

The Department of Chemistry offers the following programs of study:

- * The Bachelor of Arts degree with a major in chemistry
- * The Bachelor of Science degree with a major in chemistry - ACS certified
- * The Bachelor of Science degree with a major in chemistry
- * A minor in chemistry

The Bachelor of Science degree is designed primarily for those who wish to pursue a career in chemistry or a career in which chemistry plays a central role.

The department offers two Bachelor of Science degrees. The Bachelor of Science with a major in chemistry (ACS certified) meets guidelines established by the American Chemical Society (ACS). It provides an extensive education in all branches of chemistry and also emphasizes laboratory training. The non-certified major does not emphasize laboratory work as strongly, offers more options among chemistry courses, and allows more flexibility in incorporating coursework outside of chemistry.

The Bachelor of Arts in chemistry fills the needs of students whose chosen career requires a strong background in chemistry with additional expertise in other disciplines.

Bachelor of Science

Suggested First- and Second-Year Courses: CHEM 142, CHEM 152, CHEM 162 (or CHEM 145, CHEM 155, CHEM 165); CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346, CHEM 347); MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116 plus one physics lab course. PHYS 121 sequence recommended); courses in linear algebra and differential equations.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Chemistry (ACS-Certified)

94 credits as follows:

1. Core Courses:
 - a. General Chemistry: CHEM 142, CHEM 152, CHEM 162 (or CHEM 145, CHEM 155, CHEM 165)
 - b. Organic Chemistry: CHEM 237, CHEM 238, CHEM 239, CHEM 241, and CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346 and CHEM 347)
 - c. Inorganic Chemistry: CHEM 312, CHEM 317, CHEM 321, and CHEM 416 (students completing CHEM 165 are exempt from CHEM 312)
 - d. Analytical Chemistry: CHEM 321, CHEM 426
 - e. Physical Chemistry: CHEM 455, CHEM 456, and CHEM 457 (or CHEM 475, CHEM 476, and CHEM 477); CHEM 461
 - f. Biochemistry: BIOC 405 (students should contact adviser regarding alternative prerequisites for BIOC 405)
 - g. 5 credits of numerically graded CHEM or BIOC 400-level courses (not previously listed) which must include CHEM 426 and CHEM 461 and one more course with laboratory (currently CHEM 462, CHEM 463, CHEM 464, and CHEM 465)
 - h. Strongly recommended, research credits in CHEM 399 and CHEM 499.
2. MATH 124, MATH 125, MATH 126 and two additional math courses above 300 (recommended MATH 307 and MATH 308, or AMATH 351 and AMATH 352); (alternative math requirement: MATH 134, MATH 135, MATH 136)
3. PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116 plus one physics lab course). PHYS 121 sequence recommended.
4. Minimum grade of 2.0 is required in each chemistry course; a minimum GPA of 2.80 is required for courses used to satisfy the major degree requirements; a minimum overall cumulative GPA of 2.80 and minimum 184 credits required for graduation.

Chemistry

91 credits as follows:

1. Core Courses:
 - a. CHEM 142, CHEM 152, CHEM 162, and CHEM 312 (or CHEM 145, CHEM 155, CHEM 165, and CHEM 416)
 - b. CHEM 237, CHEM 238, CHEM 239, and CHEM 241 (or CHEM 335, CHEM 336, CHEM 337, and CHEM 346)
 - c. CHEM 455, CHEM 456, and CHEM 457 (or CHEM 475, CHEM 476, and CHEM 477)
 - d. Two of the following three: CHEM 317, CHEM 321, or CHEM 461 (CHEM 461 for 4 credits only)
 - e. 5 additional lab credits chosen from the following: CHEM 242, CHEM 317, CHEM 321, CHEM 347, CHEM 426, CHEM 461, CHEM 462, CHEM 463, CHEM 464, CHEM 465, and BIOC 426
 - f. 11 credits chosen from CHEM 242, CHEM 317, CHEM 321, CHEM 347, any 400-level numerically graded chemistry or biochemistry courses, or MATH 307 (or AMATH 351). Students with chemistry GPA of 3.30 or higher may apply up to 6 credits of CHEM 399, CHEM 496, or CHEM 499 of approved research (but CHEM 498 may not be used to satisfy this requirement).
2. MATH 124, MATH 125, MATH 126 and one course above 300 (recommended: MATH 308 or AMATH 352); alternative MATH requirement: MATH 134, MATH 135, MATH 136.
3. PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116 plus one physics lab course). PHYS 121 sequence recommended.
4. Minimum grade of 2.0 is required in each chemistry course; minimum GPA of 2.80 is required for all CHEM, MATH, and PHYS courses used to satisfy major requirements.

5. For graduation, a minimum of 181 credits is required with an overall cumulative GPA of 2.80.

Bachelor of Arts

Suggested First- and Second-Year Courses: CHEM 142, CHEM 152, CHEM 162 (or CHEM 145, CHEM 155, CHEM 165) CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346, CHEM 347); MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); PHYS 121, PHYS 122, PHYS 123 (or PHYS 114, PHYS 115, PHYS 116 plus one physics lab course; PHYS 121 sequence recommended).

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

84 credits as follows:

- Core Courses:
 - CHEM 142, CHEM 152, CHEM 162, CHEM 312 (or CHEM 145, CHEM 155, CHEM 165)
 - CHEM 321
 - CHEM 237, CHEM 238, CHEM 239, CHEM 241, CHEM 242 (or CHEM 335, CHEM 336, CHEM 337, CHEM 346, CHEM 347)
 - Either CHEM 317 or CHEM 461
 - 11 credits of numerically graded CHEM 400-level courses to include either CHEM 455, CHEM 456, CHEM 457 series, or CHEM 452, CHEM 453 series
- MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136)
- One year of physics including at least 1 credit of laboratory (PHYS 114, PHYS 115, and PHYS 116 and at least one of PHYS 117, PHYS 118, or PHYS 119; or PHYS 121, PHYS 122, and PHYS 123; PHYS 121 sequence recommended).
- Minimum GPA of 2.0 in chemistry courses counted toward major; and a minimum grade of 1.7 in all required chemistry courses.

Minor

Minor Requirements: 35-44 credits as follows:

- One of the following two sequences
 - CHEM 142, CHEM 152, CHEM 162 and one of CHEM 223, CHEM 237 or CHEM 335
 - CHEM 145, CHEM 155, CHEM 165, and one of CHEM 223, CHEM 237, or CHEM 335
- MATH 124 (or Q SCI 291 and Q SCI 292)
- PHYS 114 or PHYS 121
- Three of the following four groups:
 - CHEM 312 (or CHEM 165)
 - CHEM 321
 - One of CHEM 355, CHEM 452, CHEM 455, CHEM 456
 - One of CHEM 224, CHEM 238, CHEM 336
- Minimum GPA of 2.00 for the minor and a minimum grade of 1.7 in each course presented for the minor.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* At the conclusion of their studies, graduating chemistry majors should have a general knowledge of the basic areas of chemistry with a working knowledge of at least one area: be proficient in basic laboratory skills; have the ability to carry out strategies for solving scientific problems; have an understanding of the principles and applications of modern instrumentation, computation, experimental design, and data analysis; have had the opportunity to gain experience with a research project; have the ability to communicate scientific information clearly and precisely; have the ability to read, understand, and use scientific literature; have an awareness of the broader implications of chemical processes; have had the opportunity to work as part of a team to solve scientific problems; and have had an introduction to opportunities in, and requirements for, the careers available to chemistry majors.

Teaching high school chemistry, environmental or patent law practice, or working in the chemical industry in sales or management positions are career choices for which the B.A. in chemistry is generally useful.

* *Instructional and Research Facilities:*

- Departmental facilities include a spectroscopic and analytical instrumentation laboratory (NMR, GC-MS, X-Ray, IR), Chemistry Library, Center for Process and Analytical Chemistry (CPAC), Materials and Devices for Information Technology Research (MDITR), Center for Nanotechnology, and extensive computing capabilities.
- The department's local area network (LAN) is extended through a fiber optic cable to the university-wide network that is connected to Internet, HEPNET, SPAN, and other national and international computer networks.
- The Chemistry Study Center offers assistance to students in 100 level chemistry courses and has 40 Pentium computers available to undergraduates taking chemistry courses.

- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

- * *Research, Internships, and Service Learning:* No formal internship program. Students are encouraged to pursue national and regional internships. See advisers for information.

- * *Department Scholarships:* Resident tuition scholarships and book prizes are awarded annually by the Department of Chemistry to eligible chemistry and biochemistry majors. Applications are available during the month of March for the following academic year. See department advisers for more information.

* *Student Organizations/Associations:*

- Alpha Chi Sigma: the UW affiliate of the national chemistry-related science organization for chemistry and biochemistry majors
- Phi Lambda Upsilon: the UW affiliate of the national chemistry honorary society
- The Free Radicals: a general undergraduate club for chemistry and biochemistry majors

Of Special Note:

- The B.S. degree in chemistry requires a minimum of 181 credits to graduate.
- The B.S. degree in Chemistry, ACS-Certified Option, requires a minimum of 184 credits to graduate.
- The B.A. degree in Chemistry requires a minimum of 180 credits to graduate.
- Students are strongly encouraged to participate in undergraduate research.
- The maximum number of credits that may be earned combining CHEM 199 and CHEM 299 is 12; the maximum number of credits that may be earned combining CHEM 399 and CHEM 499 is 24.

Graduate Program

Graduate Program Coordinator
109D Bagley, Box 351700
206-543-4787
graduate@chem.washington.edu

The Master of Science and Doctor of Philosophy programs are designed to lead to positions of leadership and independent investigation in research institutes, industrial laboratories, and government agencies, and as teachers, researchers, or administrators in colleges and universities in chemistry or allied fields.

Students can pursue research in the following areas of chemistry: analytical, bioanalytical, bioinorganic, bioorganic, biophysical, environmental, inorganic, medicinal, nuclear, organic, organometallic, physical, polymer, process analytical, and theoretical.

Thesis research for the Master of Science degree and dissertation research for the Doctor of Philosophy degree will constitute an original contribution of knowledge worthy of report in the scientific literature.

Master of Science

The Department of Chemistry offers primarily the Ph.D. degree. The Master of Science program is not open to master's-only students, except under specific conditions.

Graduation Requirements: With Thesis -- 36 approved credits with 18 in courses at the 500 level or above; 21 credits in courses at the 400 or 500

level taken for numerical grade; 9 credits in thesis research. Without Thesis -- Same as with thesis, except that additional course work may be substituted for the required research. Minimum GPA of 3.00 required.

Doctor of Philosophy

Admission Requirements

- * Baccalaureate degree with major in chemistry or allied sciences
- * Graduate Record Examination scores
- * TOEFL score of 237 and TSE score of 50 if international student

Degree Requirements

90 credits, as follows:

- * *Required coursework:* 18-27 credits of coursework to support the student's individualized program of study, approved by the Graduate Program Coordinator, at the 400 or 500 level, with a minimum 3.00 GPA
- * *Seminars:* Participation in departmental seminars
- * *Dissertation:* minimum 27 credits of dissertation (CHEM 800) work
- * Candidacy examinations covering area of specialization

Course Descriptions

See page 311.

Classics

218 Denny

The discipline of classics concerns itself with the cultures of ancient Greece and Rome from prehistoric times to the Middle Ages. The department is concerned with the Greek and Latin languages and their literatures, including poetry, drama, history, philosophy, rhetoric, and political theory, as well as with classical art and archaeology. The ancient cultures of Greece and Rome hold an extraordinary place in the American past and present, thanks to their central role in forming the basic conceptual categories that shape our intellectual, professional, and civic lives. The vast temporal and geographic gulf that divides these ancient cultures from modernity brings students and scholars of classics face to face with the otherness of antiquity and forces a critical examination of our own cultural roots.

Undergraduate Program

Adviser
218 Denny, Box 353110
206-543-2266
clasdept@u.washington.edu

The Department of Classics offers the following programs of study:

- * The Bachelor of arts degree with majors in classics, Greek, Latin, and classical studies.
- * Minors in classical studies, Greek, Latin, and classics and ancient history.

The majors in classics, Greek, and Latin emphasize the development of expertise in Greek and Latin and can include coursework in the history, literature, philosophy, science, and the art and archaeology of these two contrasting but related cultures. Students who intend to continue their studies to the Ph.D. degree are advised to take the B. A. in classics or, alternatively, the B.A. in Latin or Greek with as many courses in the second language as possible.

A fourth major, the Bachelor of Arts in Classical Studies, is especially suited to students wishing to explore the literature, history, art, archaeology, and philosophy of classical antiquity primarily through English translations. The classical studies major demands less study of the classical languages of Greece and Rome than is required for the other majors. Students with no previous exposure to Greek or Latin can complete the classical studies major in two years. Students have often combined this major with another major such as English, history, or art history, and even with a non-humanities major such as computer science, biochemistry, or economics.

Bachelor of Arts

Suggested First- and Second-Year College Courses: First- and second-year Latin and/or classical Greek, classics in translation, ancient history, classical art and archaeology, ancient philosophy.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

66 credits in each of the majors, as follows:

- * *Greek:* 27 approved credits in Greek at the 400 level plus 9 credits chosen with department approval from courses in Latin, Greek at the 400 level, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. The major must include a minimum of 2 credits of CLAS 495.
- * *Latin:* 27 approved credits in Latin at the 400 level plus 9 credits chosen with department approval from courses in Greek, Latin at the 400 level, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. The major must include a minimum of 2 credits of CLAS 495.
- * *Classics:* 15 approved credits in Greek at the 400 level and 15 approved credits in Latin at the 400 level; 6 additional credits (including 2 credits of CLAS 495) chosen from the following courses: Greek and Latin at the 400 level, classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.
- * *Classical Studies:* Greek or Latin through 307 or the equivalent; 36 additional credits chosen with department approval from the following courses: Greek and Latin at 400 level (including a minimum of 2 credits of CLAS 495), classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science. Classical studies is especially suited to students not preparing for graduate study in classics but wishing to explore the literature, history, art, archaeology, and philosophy of classical antiquity primarily through English translations.

Minor

Minor Requirements: 25 credits as follows for each of the minors:

- * *Classical Studies:* 25 approved credits from classics in English, classical art and archaeology, ancient history, the history of ancient philosophy, and the history of ancient science.
- * *Greek:* Minimum 25 credits in Greek, including at least 6 credits at the 400 level (excluding 490).
- * *Latin:* Minimum 25 credits in Latin, including at least 6 credits at the 400 level (excluding 490).
- * *Classics and Ancient History:* 30 credits from the following list, including at least 20 upper-division credits (15 of which must be taken at the UW). 100-level credit is not accepted. Minimum 10 credits from each department (Classics and History). A minimum grade of 2.0 is required in each course. Not available to students pursuing majors or other minors in classics.

Courses: CLAS 210, CLAS 320, CLAS 322, CLAS 324, CLAS 326, CLAS 328, CLAS 330, CLAS 424, CLAS 427, CLAS 428, CLAS 430, CLAS 432, CLAS 435, CLAS 445, CLAS 496 (except when topic is medieval); CL AR 340, CL AR 341, CL AR 342, CL AR 343, CL AR 442, CL AR 443, CL AR 444, CL AR 446, CL AR 447, CL AR 448; GREEK (all upper-division courses except GREEK 300 and GREEK 301); LATIN (all upper-division courses except LATIN 300, LATIN 301, LATIN 401, and LATIN 402); HSTAM 205, HSTAM 301, HSTAM 302, HSTAM 312, HSTAM 313, HSTAM 314, HSTAM 330, HSTAM 401, HSTAM 402, HSTAM 403, HIST 490 (when topic is ancient), HIST 498 (when topic is ancient).

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The undergraduate study of classics emphasizes critical analysis of language and culture and clear

and effective writing. The B.A. with a major in classics is a respected terminal degree in itself. Like other degree programs in the humanities, it emphasizes the acquisition of those analytic and communications skills which are indispensable for careers in government, journalism, law, industry, medicine, and business. The Classics major (especially in its more language intensive forms) is often a mark of distinction when a graduate applies for admission to professional school.

Many who take the bachelor's degree in classics go on to pursue graduate work in the subject at leading Ph.D. programs. Graduates include winners of prestigious national awards such as Mellon Fellowships for graduate study and the Rhodes Scholarship.

- * *Instructional and Research Facilities:* The departmental office provides access to several computers for research and coursework. The Classics Department sponsors numerous lectures by distinguished speakers visiting from universities in this country and abroad; undergraduates are always welcome to attend.
- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.
- * *Research, Internships, and Service Learning:* None offered.
- * *Department Scholarships:*
 - o Jim Greenfield Undergraduate Scholarship is intended for undergraduate majors in Classics. The object of the Jim Greenfield scholarship is to enable exceptionally well-qualified students to devote the maximum time and energy to their study of the Classics at the University of Washington. While the first criterion is academic promise, an applicant's current means of support will also be taken into consideration; therefore, the amount of the award may vary from partial tuition to full tuition and some expenses. Successful candidates may reapply for the following year.
 - o Jim Greenfield Undergraduate Travel Bursaries: Awards for the calendar year 2005 (including summer 2005) are made on the basis of a competition to be held in autumn quarter 2004, with an application deadline of October 15, 2004. Jim Greenfield Undergraduate Travel Bursaries may be used for the department's Rome Program, for travel associated with participation in archaeological excavations, for independent travel to areas of classical interest, or for other kinds of study-related travel for which the applicant can make a cogent case. In some cases an award might allow a student to remain overseas for study travel in the wake of the department's Rome Program. Further information about applying for a Jim Greenfield Undergraduate Travel Bursary is available in the department office.
- * *Student Organizations/Associations:* None

Of Special Note:

- * CLAS 101, CLAS 102, CLAS 205, and HIST 111 may not be taken in fulfillment of major requirements for baccalaureate degrees in the Department of Classics.
- * *Classical Seminar in Rome:* During spring quarter, the department offers instruction in classics for advanced undergraduate majors and graduate students at the University of Washington Rome Center, located in the Palazzo Pio on the Campo de' Fiori.

Graduate Program

Graduate Program Coordinator
218 Denny, Box 353110
206-543-2266
clasdept@u.washington.edu

The Department of Classics offers programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The M.A. degree may be in Greek, Latin, or Classics (a combination of Greek and Latin). The Ph.D. degree requires both Greek and Latin.

The program of formal instruction ensures comprehensive and thorough training in the basic disciplines needed for teaching and research. The department offers courses in the major writers and periods of literature, philosophy, and history, in classical art and archaeology, and in Greek and Latin linguistics. The courses in Greek and Latin literature include many works on the Ph.D.-degree reading list. Seminars introduce research techniques through the study of more specialized topics, which vary from quarter to quarter. Students may include in their programs courses and

seminars given by other departments in such subjects as ancient philosophy, ancient and medieval history, comparative literature, and linguistics.

Master of Arts

Admission Requirements

Strong preparation in Latin and Greek, preferably a full undergraduate major. Although the M.A. may be attained with work in only one of the languages, students who plan to work toward the Ph.D. must be prepared to do graduate work in both Latin and Greek.

Degree Requirements

36 credits, as follows:

- * 27 credits in courses and seminars approved by the department as applicable toward an advanced degree and either a) 9 additional credits and a research paper or b) a thesis (9 credits). At least 18 of the total 36 credits must be at the 500 level or above.
- * Competence in reading German, French, or Italian, demonstrated by passing a departmental examination.

Doctor of Philosophy

Admission Requirements

Strong preparation in Latin and Greek, preferably a full undergraduate major. Admission to the Ph.D. program is granted after completion of the M.A. degree.

Degree Requirements

90 credits, as follows:

- * Minimum three academic years of graduate study, of which at least two must be at the UW, and one in full-time residence at the University for three out of four consecutive quarters.
- * 90 credits in courses approved by the department. At least half (which include dissertation credits) must be at the 500 level or above.
- * Competence in reading German and French, or German and Italian, demonstrated by passing departmental examinations.
- * Graduate courses (or the equivalent) in Greek and Latin composition.
- * The Classics proseminar (or equivalent).
- * Written preliminary examinations:
 - o Translation exams on Greek and Latin literature. Reading lists in each language guide the student's preparation for these exams.
 - o A written examination on a special field of Classical studies, e.g. a period of Greek or Roman history, Greek or Latin epigraphy, Athenian or Roman topography, Greek or Roman religion, Classical linguistics, metrics, or palaeography, an area of intellectual history, a literary theme or cultural institution. This examination must be taken before the doctoral orals but is preferably taken earlier in the student's graduate program.
 - o Written examinations on two special authors, one Greek and one Latin, which assume a deep familiarity with the text, a knowledge of the textual history, and the important secondary works and trends in scholarship. A special author examination may be taken only after the translation examination in that language has been passed.
- * An oral general examination on Greek and Roman history, literature, philosophy, and related subjects.
- * A dissertation approved by the student's Supervisory Committee, and an oral examination on the dissertation.
- * Graduate students are expected to have teaching experience before completing their terminal degrees.

Research Facilities

The Suzzallo Library has an extensive classics collection. The department's seminar room in Denny Hall, which is available to graduate students for their study and research, contains an excellent noncirculating library with such reference works as Pauly-Wissowa, L'Année Philologique, the Thesaurus Linguae Latinae, the Müller Handbuch series, the Teubner and Oxford texts, commentaries on the classical authors, standard collections of inscriptions and fragments, and a number of important serials. The department also possesses an Ibycus scholarly computer and a license for the Thesaurus Linguae Graecae, Thesaurus Linguae Latinae, Perseus, and other databases.

Teaching Assistantships

A number of teaching assistantships as well as the Jim Greenfield Graduate Fellowship are available. Assistants teach sections of elementary Latin and Greek, a course in Latin and Greek derivatives, hold discussion sections in classical literature in translation, or assist faculty members with other courses. The teaching load is four to six hours a week throughout the academic year.

Course Descriptions

See page 314.

Communication

102 Communications

Communication is a process that creates and reveals meanings, relationships, and cultural patterns.

Undergraduate Program

Adviser
118 Communications, Box 353740
206-543-8860

The Department of Communication offers the following programs of study:

- * The Bachelor of Arts degree with a major in communication
- * The Bachelor of Arts degree with a major in communication: journalism

Bachelor of Arts

Suggested First- and Second-Year College Courses: COM 201, COM 202.

Department Admission Requirements

1. Admission is competitive, based on information in the application packet, cumulative GPA, and grades in COM 201 and/or COM 202. Minimum cumulative 2.50 GPA ensures consideration, but not acceptance.
2. Students are admitted quarterly -- autumn, winter, and spring. Applications are due Monday, the third week of autumn, winter, and spring quarters. Applications and additional information are available on the Web and in 118 Communications. Students are notified of acceptance by the end of the fifth week of the quarter. If accepted, they can register for the next quarter as majors.
3. Applications are available from the department Web site on the first day of the quarter. Applications should include application form, copies of transcripts and grade reports, and an essay explaining what led applicants to apply to the major.
4. Minimum 45 quarter credits completed (transfer students must complete at least 10 graded credits at UW). For the standard Communication program, credits must include completion of COM 201 and COM 202 or completion of one of these and current enrollment in the other. For the Journalism option, credits must include completion of either COM 201 or 202.

Major Requirements

Communication: 50 credits, to include the following:

1. *Introductory courses (10 credits):* COM 201 and COM 202.
2. *Methods in inquiry (5 credits):* Examples of courses that apply include COM 382, COM 405, and COM 485. For full list, see department adviser or Web.
3. *Area concentration (15 credits) in one of the following:* communication and culture, communication technology and society, international communication, political communication, rhetoric and critical studies, or social interaction. See advising office or Web for description of each area and lists of qualifying courses.
4. *Electives (20 credits)* from the Department of Communication and from selected courses outside the department. See advising office or Web for electives list.

Of the 50 required credits specified above, at least 20 must be Communication courses at the 300 level or above, and of those 20, at least 10 must be Communication courses at the 400 level (excluding COM 498/499).

Journalism Option: A minimum of 61 credits, including the following:

1. *Introductory courses (5 credits):* Either COM 201 or COM 202.
2. *Skills/Competencies core (13 credits):* COM 360, COM 361, COM 362.
3. *Law and Ethics core (10 credits):* COM 440, COM 468.
4. *Emphasis/Specialization (10 credits) in one of the following areas:* communication and culture, communication technology and society, international communication, political communication, rhetoric and critical studies, or social interaction. See advising office or Web for description of each area and lists of qualifying courses.
5. *Advanced Skills/Competencies (8 credits minimum) selected from the following:* COM 301, COM 460, COM 461, COM 463, COM 465, COM 466.
6. *Other requirements (15 credits):* 5 credits each in economics, political science, and history. See advising office for list of acceptable courses.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The Department of Communication prepares students for the challenges of a society that is informed, entertained, persuaded, and shaped by communication. The department seeks out and appeals to students from a variety of backgrounds and perspectives. It nurtures socially responsible, literate citizens who can interpret and evaluate images and messages they create and receive. It teaches students to think critically, respect diversity, communicate effectively, and develop the skills needed for the life-long learning that is central to successful careers and rewarding lives. Undergraduate study in communication has four pedagogical emphases: communication literacy, communication inquiry, theory and concepts, and community engagement.

* *Instructional and Research Facilities:* The Department of Communication has the following labs: Media Lab. News Lab. Observation Labs. It also has an Instructional Resources Center and video-editing facilities. Additionally, the department manages the following centers: The Dart Center, the Center for Communication and Civic Engagement, and the Resource Center for Cyberculture Studies. See the department Web site for further information.

* *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* See adviser for details.

* *Department Scholarships:* None offered

* *Student Organizations/Associations:*

- o Society of Professional Journalists
- o Public Relations Student Society of America

Graduate Program

Graduate Program Coordinator
221 Communications, Box 353740
206-543-7269
cominfo@u.washington.edu

Graduate study in communication engages students in the complexity of modern communication and its centrality to society and, in doing so, prepares them to become thoughtful scholars, teachers, practitioners, and leaders related to this field. The Department of Communication offers graduate programs leading to the degrees of Master of Arts, Doctor of Philosophy, and Master of Communication (M.C.).

Graduate study in the Department of Communication is guided by four related principles: intellectual and cultural pluralism, interdisciplinary theorizing, collaboration, and public scholarship. Coursework brings together humanistic and social scientific intellectual traditions through a unified core curriculum and a wide selection of graduate seminars. Research and teaching in the department focus on six interrelated areas: communication and culture, communication technology and society, international communication, social interaction, political communication, and rhetoric and critical studies.

The M.A. degree program provides training in research and scholarship and can be either preparation for doctoral study or a terminal degree. The M.A. degree requires a minimum of 45 credits of approved coursework and a research thesis. The Ph.D. degree program develops conceptual and methodological capabilities in a substantive area of communication. The Ph.D. degree requires completion of a minimum of 45 post-master credits,

general examinations, and a dissertation demonstrating an original scholarly contribution to the field.

The Department of Communication also offers three M.C. degrees, each of which has specific requirements tailored to that degree. The general M.C. degree is targeted for mid-career communication professionals who seek to develop an understanding of communication theory related to a special area of interest. The M.C. in digital media is a professional degree focused on digital media content creation, management, and policy. Native Voices is an M.C. degree offered in conjunction with American Indian Studies. It is designed for documentary filmmakers who focus their work on subjects relevant to the Native American Community.

Master of Arts

Admission Requirements

- * Minimum 3.00 or B GPA over the two most recent years guarantees consideration. However, average GPAs for the students admitted have been higher.
- * M.A. applicants must show proof of completion of a bachelor's degree prior to starting the program, though it is common for applicants to be in their senior year of college when they apply to the M.A. program.
- * Full-time status is strongly encouraged, but domestic U.S. residents who do not receive assistantships can enroll half-time.
- * Note to U.S. permanent residents/immigrants (green card holders): Applicants who are not native speakers of English must submit TOEFL scores taken within the past two years. Only the following applicants are exempt from the TOEFL requirement: citizens of the United States, Australia, Canada, Ireland, New Zealand or the United Kingdom and non-United States citizens who have received a bachelor's degree or higher from a U.S. institution or from institutions in the countries listed here. Applicants who are not U.S. citizens must also submit a TSE score to be considered for departmental funding. Permanent residency/immigrant status or a degree from the U.S. does not exempt one from this TSE requirement.

Degree Requirements

45 credits minimum, as follows:

- * Three core courses (COM 500, COM 501, COM 502) during the first year of study.
- * One additional methods course beyond COM 501
- * Up to 5 credits of COM 594 in five different topics may count toward total, although COM 594 credits are not required for master's students.
- * Up to 3 credits of COM 596 may count toward total. These credits are required for students with assistantships and optional for all others.
- * Completion of the thesis (minimum 10 credits in COM 700) and oral defense.
- * Specific courses should be selected in consultation with the supervisory committee.

Master of Communication

Admission Requirements

Admission requirements are the same as for the Master of Arts program (above).

Degree Requirements

45 credits minimum, as follows:

- * At least 12 credits in Communication courses at the 400 and 500 level.
- * At least 15 credits outside the Department of Communication in a coherent substantive area of specialization.
- * 10 credits in COM 600 to produce a professional project in an area of specialization for broadcast or publication.
- * Passage of an oral defense of the project.
- * The remaining credits necessary to meet the 45 credits for the degree should be selected in consultation with the supervisory committee.
- * At least 21 credits must be at the 500- or 600-level.
- * Up to 5 credits of COM 594 may count toward total, although COM 594 credits are not required for M.C. students.
- * Up to 3 credits of COM 596 may count toward total. These credits are required for students with assistantships and optional for all others.

Digital Media

The Master of Communication (M.C.) in Digital Media is a professional degree focused in three concentrations: digital media content creation, management, and policy. 45 credits minimum as follows:

- * *Three core courses:* COM 529 (5), COM 546 (5), and COM 558 (5).
- * Students may choose either to complete 45 credits of course work or to complete 40 credits of course work (including three core courses) and a final project worth 5 credits. Specific courses should be selected in consultation with the supervisory committee.

Native Voices

45 credits, as follows:

- * 20 credits in the Department of Communication:
 - o 10 credits of 500-level communication courses. This is typically two 500-level seminars.
 - o COM 600: 10 credits in Documentary Research and Production. To be taken for the completion of the final project.
- * 25 credits in American Indian Studies/Native Voices: WOMEN 443 (5), AIS 501 (5), AIS 502 (5), AIS 503 (5), AIS 504 (5)

Research Facilities

In addition to the University's research facilities available to all students, the Department of Communication houses a collection of specialized research laboratories, including the Digital Media Lab, Graduate Computer Lab, Observational Research Facility, Instructional Resources Center, and Video Editing Lab.

Course Descriptions

See page 317.

Comparative History of Ideas

B102 Padelford

Comparative History of Ideas is an interdisciplinary program that draws on a wide variety of disciplines within the College of Arts and Sciences to examine the interplay of ideas and their cultural, historical, and political contexts.

Undergraduate Program

Adviser
B102D Padelford, Box 354300
206-543-2097
chid@u.washington.edu

The Comparative History of Ideas program offers the following programs of study:

- * The Bachelor of Arts degree with a major in comparative history of ideas
- * A minor in comparative history of ideas

Bachelor of Arts

Suggested First- and Second-Year College Courses: Course work in the history of relevant periods, areas, and themes. Introductory courses in philosophy, English, comparative literature, ethnic and gender studies, and other areas of the humanities and social sciences. CHID 110.

Department Admission Requirements

Students in good academic standing may declare this major after meeting with an adviser.

Major Requirements

55 credits as follows:

1. 10 credits in Group A: Introduction to the History of Ideas
2. 10 credits in Group B: History of Intellectual Cultures (5 credits in each subgroup)

3. 10 credits in Group C: History of Particular Ideas or Themes
4. CHID 390: The Colloquium in the History of Ideas
5. A 5-credit senior project (CHID 491)
6. The remaining 15 credits should be chosen from among approved electives.
7. At least half of the credits presented for the major must be at the upper-division level.
8. A minimum GPA of 2.50 in the classes presented for the major.
9. Students may expand the senior project to 10 or 15 credits if they choose (CHID 492/493). The 5 to 10 optional senior project credits are in addition to the 55 credits required of all CHID majors.

Please see the program adviser for current lists of Group A, B, and C courses.

Minor

Minor Requirements: 30 credits as follows:

1. 5 credits in Group A: Introduction to the History of Ideas
2. 10 credits in Group B: History of Intellectual Cultures (5 credits in each subgroup)
3. 5 credits in Group C: History of Particular Ideas or Themes
4. CHID 390: The Colloquium in the History of Ideas
5. A 5-credit CHID 498: Special Colloquia.

Please see the program adviser for current lists of Group A, B, and C courses.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The program encourages students to adopt nuanced perspectives on their position relative to texts, cultures, societies, and historical periods. Program graduates have gone on to postgraduate studies in the humanities and social sciences, as well as professional training and careers in a wide variety of fields including law, administration and public policy, medicine, education, journalism, new media, and film.
- * *Instructional and Research Facilities:* The program provides computer workstations for students in Padelford B102.
- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.
- * *Research, Internships, and Service Learning:* CHID undergraduates participate in a variety of educational experiences outside the classroom. For example, many of the study abroad programs incorporate an "engaged community learning" project, which provides an opportunity for students to apply their analytical skills and understanding of the historical and cultural context to a close participation in the work of local organizations. The diversity of these community efforts allows students to engage their particular interests through participation in social welfare organizations, grassroots community groups, after-school programs, health clinics, theater and other performing arts groups, as well as video and other visual arts projects.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* CHID students spear-headed the formation and development of the DIALOGUE Project, a group open to all UW students interested in international issues. The project serves to facilitate greater international and intercultural dialogue within our own community centered around topics germane to each student's own educational goals. Many students work directly to develop and help coordinate international clubs in high schools across the state.

Of Special Note: CHID also sponsors *interSections*, a student journal published annually by the Comparative History of Ideas program. *interSections* is organized and edited by undergraduate volunteers from the CHID program.

Course Descriptions

See page 322.

Comparative Literature

B-531 Padelford

Comparative literature works across national and regional boundaries to explore the relationships among multiple literary traditions. Comparative literature also focuses on the relationship of literature to the other arts and to fields of knowledge such as philosophy, anthropology, history, and media or cultural studies.

Undergraduate Program

Adviser
B-534 Padelford, Box 354338
206-685-1642
kholl@u.washington.edu

Comparative Literature offers the following programs of study:

- * Bachelor of Arts with a major in comparative literature
- * Bachelor of Arts with a major in comparative literature (cinema studies)
- * Minor in comparative literature (literature minor only)

The literature option includes core course requirements in literary analysis (C LIT 300), literary theory (C LIT 400) and regional literatures (C LIT 320, C LIT 322, C LIT 323).

The cinema studies option is structured around two series of required core courses devoted to film theory and film history.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Courses in foreign languages, classics, history, philosophy, literature, and writing. Sufficient preparation in a foreign language (completion of second year or higher) to enable the student to take a 300- or 400-level literature or national film course by the senior year.

Department Admission Requirements

Minimum 2.00 overall GPA; completion of one course fulfilling either College of Arts and Science English composition requirement or the W (writing) requirement (5 credits).

Cinema Studies: Same as above, plus completion of C LIT 270 or the equivalent.

Major Requirements

Literary Studies Option (50 credits):

- * C LIT 300, C LIT 400 (10 credits).
- * Two differently-numbered courses from among C LIT 320, C LIT 321, C LIT 322, C LIT 323 (10 credits).
- * Two additional courses in comparative literature at the 300 or 400 level (10 credits).
- * At least one foreign literature course, studied in the original language (3/5 credits). The minimum foreign language prerequisite to meet this requirement is completion of a second year (often higher) of the foreign language, e.g., GERMAN 203 for GERMAN 311; FRENCH 302 for FRENCH 304.
- * Remaining (17/15 credits) to be earned, with few exceptions, in 300- and 400- level literature courses from among the offerings of Comparative Literature and the following participating departments: Asian Languages and Literature, Classics, English, Germanics, Near Eastern Languages and Civilization, Romance Languages and Literature, Scandinavian Studies, and Slavic Languages and Literatures.

Cinema Studies Option (50 credits):

- * 15 credits from cinema studies core courses, with at least one course in film theory and one course in film history (C LIT 301, C LIT 302, C LIT 303, C LIT 310, C LIT 311, C LIT 312).
- * 10 credits from C LIT core requirements (choice of either C LIT 300 or 400, and one course from C LIT 320, C LIT 321, C LIT 322, C LIT 323).
- * One national cinema course (3/5 credits).
- * Minimum two years of foreign language study (e.g., through GERMAN 203, or equivalent).
- * Remaining credits to be earned in recommended 300- and 400-level

cinema elective courses offered by Comparative Literature or any UW department.

Minor

Minor Requirements: 30 credits to include C LIT 300, C LIT 400, and two differently numbered courses from among C LIT 320, C LIT 321, C LIT 322, and C LIT 323; at least one course in a literature, studied in the original language, other than English; and the remaining credits in upper-division literature courses offered through Comparative Literature and the following participating departments: Asian Languages and Literature, Classics, English, Germanics, Near Eastern Languages and Civilization, Romance Languages and Literature, Scandinavian Studies, and Slavic Languages and Literatures.

A minor is not available for the Cinema Studies option.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The study of comparative literature provides training in the analysis and critique of varied kinds of social texts and discourses. It stresses the centrality of historical and cross-cultural awareness for effective interpretation of both verbal and visual texts. Students earning the degree in comparative literature may pursue advanced work at the M.A. and Ph.D. level in language and literature programs, or allied curricula in film studies, philosophy, intellectual history, and cultural studies. They may aim for degrees in education, specializing in language arts, foreign language teaching, or both. Comparative literature majors may also find jobs in fields where liberal arts skills, such as strong writing ability and fluency in foreign languages, are valued. Cinema studies majors often seek positions associated with film production and distribution.

* *Honors Options Available:* Departmental honors by invitation. See adviser.

* *Undergraduate Research, Internships, and Service Learning:* See adviser for internship information.

* *Department Scholarships:* Some financial support available for student film projects.

* *Student Organizations/Associations:*
o Film Club, film@u.washington.edu
o UW Film Colloquium, filmcol@u.washington.edu

Of Special Note: A maximum of 5 credits of internship (C LIT 491) may be applied toward the Cinema Studies major.

Graduate Program

Graduate Program Coordinator
B531 Padelford, Box 354338
206-543-7542
clitgrad@u.washington.edu

The Department of Comparative Literature offers a program of study with faculty members from the following participating departments: Asian Languages and Literature, English, French and Italian Studies, Germanics, Near Eastern Languages and Civilization, Scandinavian Studies, Slavic Languages and Literatures, Spanish and Portuguese Studies, and Women Studies. Study leads to a Master of Arts or Doctor of Philosophy degree. Students concentrate on graduate courses in comparative literature and specialize in two or more national literatures of major interest to them, studied in the original language. With permission, a Ph.D. aspirant may choose as a third area of study a field outside of literature (e.g., philosophy, religion, art, political thought). On receiving the advanced degree, the student is qualified for teaching and research in comparative and general literature, as well as the language and literature of specialization.

Master of Arts

Admission Requirements

Bachelor of Arts degree in Comparative Literature, English, or any other literature, or equivalent background; advanced reading knowledge in one language other than English.

Degree Requirements

45 credits, as follows:

- * *Coursework:* Minimum 45 quarter credits at the 400 and 500 level, of which at least 25 must be at the 500 level. Three courses must be taken in comparative literature. Remaining credits must include study in two or more literatures with at least three courses in each of two literatures.
- * *Language Requirements:* Advanced reading knowledge in at least one language other than English and a basic reading knowledge of a second, demonstrated before starting to write the M.A. essay. Language competence is attested either by exams or by completion of satisfactory coursework in the language.
- * *Essay:* Prepared after completion of coursework, under supervision of two faculty members.
- * *Study Abroad:* Students are encouraged to study abroad by participating in exchange programs offered through the individual language and literature departments or through the UW's Office of International Programs and Exchanges.

Doctor of Philosophy

Admission Requirements

Master of Arts degree in Comparative Literature, English, or any other literature, or equivalent background; advanced reading knowledge in two languages other than English.

Degree Requirements

90 credits, as follows:

- * *Coursework:* Minimum 90 postbaccalaureate degree credits at the 400 and 500 level of which at least half in each section of the program must be at the 500 level. Credits must include: 1) at least 30 credits in comparative literature courses; 2) 30 credits in the literature of major interest to the student; 3) 20 credits in the student's minor field (or, if more than one minor field is chosen, at least 15 credits in each); 4) 10 elective credits chosen from any area of the student's choice. One of two minor fields may be extra-literary.
- * *Language Requirements:* Advanced reading knowledge in two languages other than English and a basic reading knowledge of a third, demonstrated before Ph.D. examinations are administered. Language competence is attested either by exams or by completion of satisfactory coursework in the language.
- * *General Examination:* The General Examination requires one quarter and is taken after completion of the 90 credit course requirement and language requirements. The examination, taken within three quarters of completion of coursework, consists of the following two sections: 1) eight-hour written examinations in each of the following three areas: a) a period exam in the student's primary national literature; b) comparative literature exam; and c) comparative theory exam; 2) an oral comprehensive examination evaluating the student's overall preparation for dissertation work.
- * *Dissertation:* Dissertation topics are chosen from a broad range of areas including: 1) the comparative study of authors or themes in different languages; 2) issues in the fields of theory of literature and history of criticism; 3) the study of literary authors or themes whose significance transcends national or linguistic boundaries; 4) the study of such phenomena as transmission, reception, and influence.
- * *Final Examination:* Candidates must pass an oral examination devoted to the dissertation and to fields covered by their written exams.
- * *Study Abroad:* Students are encouraged to study abroad by participating in exchange programs offered through the individual language and literature departments or through the UW's Office of International Programs and Exchanges.

Financial Aid

The department awards teaching assistantships annually to qualified students and provides up to five years of support toward the Ph.D. to students who enter with a B.A. Teaching assistantships can be assigned in Comparative Literature, Cinema Studies, or in any of the national literature departments affiliated with Comparative Literature.

Course Descriptions

See page 323.

Computer Science

AC101 Paul G. Allen Center for Computer Science and Engineering

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in such topics as the representation and storage of information; algorithms to access, display, edit, and transform information; programming languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead to practical developments in computer systems software, such as operating systems and compilers; in application areas, such as artificial intelligence, computer graphics, and computational biology; and also lead to theoretical investigations of computers, algorithms, and data.

Undergraduate Program

Adviser

101 Paul G. Allen Center for Computer Science and Engineering, Box 352350
206-543-1695
ugrad-advisor@cs.washington.edu

The Department of Computer Science and Engineering offers the following programs of study:

- * The Bachelor of Science degree with a major in computer science
- * The Bachelor of Science degree with a major in computer engineering (see Computer Engineering section)

The core requirements of the two undergraduate majors are identical. The computer science major may be more appropriate for students who want to earn a double major with another College of Arts and Sciences program, who want the additional flexibility of the computer science requirements (the computer engineering major has more required courses and fewer electives), or who may be more interested in the theory, design, and implementation of software systems and applications (for example, the techniques of modern compilers or the algorithms behind computer graphics and animation).

The computer engineering major may be more appropriate for students who are interested in creating and building systems that include both hardware and software components and that must be engineered to meet a variety of cost and performance constraints. The program includes a general foundation in engineering fundamentals to enable interdisciplinary work with other departments in the College of Engineering and the University as a whole.

Bachelor of Science

Department Admission Requirements

Applicants are considered in two groups -- Direct Admission and Upper-Division Admission. Admission is competitive. Completion of minimum requirements does not guarantee admission.

1. *Direct Admission Group:* Computer Science and Engineering enrolls up to 20 percent of its incoming class directly out of high school, prior to the completion of university-level prerequisites. Freshman applicants to the University listing Computer Science or Computer Engineering as their intended major are automatically considered. Competitive applicants will have taken calculus and at least one year of laboratory science (preferably physics) upon entering the University. Admission is for autumn quarter only.
2. *Upper-Division Admission Group:* Students must have completed MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); at least five credits of Natural World, including one of the following: PHYS 121 or CHEM 142/145 (or any approved science course that requires PHYS 121 or CHEM 142/145 as a prerequisite); CSE 142, CSE 143; and at least 5 credits of English composition. Regardless of AP credit, at least one calculus or post-calculus mathematics course and one approved Natural World course must be completed prior to applying to the department. Admission is for autumn or spring quarter. Application deadlines are July 1 for autumn quarter and February 1 for spring quarter.

Major Requirements

84-87 credits as follows:

1. *Science (10 credits):* 10 credits from the list of approved natural science courses in the CS&E Handbook. Courses that meet the department's science requirement include PHYS 121, CHEM 142/145, and any course in biology, chemistry, physics, earth and space sciences, astronomy, and atmospheric sciences that requires PHYS 121 or CHEM 142/145 as a prerequisite.
2. *Mathematics (19-22 credits):* MATH 124, MATH 125, MATH 126, (or MATH 134, MATH 135, MATH 136); MATH 308 or MATH 318 (waived if MATH 136 taken); MATH/STAT 390 or MATH/STAT 391.
3. *Required Courses (35 credits):* CSE 142, CSE 143, CSE 303, CSE 321, CSE 322, CSE 326, CSE 341, CSE 370, CSE 378.
4. *Senior Electives (minimum of 20 credits):* At least 20 credits from the senior electives courses listed in the CS&E Handbook, including at least four of the following courses: CSE 401, CSE 403, CSE 421, CSE 431, CSE 444, CSE 451, CSE 455, CSE 457, CSE 461, CSE 466, CSE 471, CSE 473.
5. The minimum acceptable grade for any required or elective CSE course is 2.0. A student's overall GPA must not fall below 2.00. Transfer students must earn a minimum of 24 graded credits toward the major at the UW.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The computer science field has a broad base of private- and public-sector jobs suitable for the Bachelor of Science graduate: systems analyst, systems programmer, applications programmer, technical sales and marketing, and hardware or software engineering specialist. In addition, there are jobs for which graduate education may be appropriate: producers and developers of computer systems, and teachers and researchers. The field is also highly valued for practicing entrepreneurship.

* *Instructional and Research Facilities:* In autumn 2003 the department moved to the new state-of-the-art Paul G. Allen Center for Computer Science and Engineering. The Allen Center includes more than 20,000 square feet of laboratories, nearly 1,000 computer systems, and more than 50 terabytes of storage. Gigabit connectivity is provided to every desktop by more than 60 miles of data cabling, and wireless access is available throughout the building.

CSE general-purpose laboratories support the diverse set of hardware and software platforms required for a cutting-edge education in the field. CSE special-purpose laboratories provide tailored support for activities such as mobile robotics, computer graphics, digital design, motion capture, embedded systems, laser scanning, educational technology, networking, and artificial intelligence.

The Allen Center is one of the finest computer science and computer engineering facilities in the nation. All of its capabilities are available to all CSE students.

* *Honors Options Available:* With Departmental Honors. See adviser for requirements.

* *Research, Internships, and Service Learning:* Internships and co-op opportunities are available for computer science undergraduates. See <http://www.engr.washington.edu/coop> and <http://depts.washington.edu/careers> for information.

* *Departmental Scholarships:* CSE has a limited number of scholarships available to current CSE majors. Scholarship information is listed at www.cs.washington.edu/education/ugradscholars/scholarships.html

* *Student Organizations/Associations:* A student chapter of the Association for Computing Machinery (ACM) operates within CSE.

Course Descriptions

See page 502.

Dance

258 Meany

Dance is part of a liberal arts curriculum and provides students with a foundation for future advanced work in performance or movement-related work. Faculty work closely with students to guide them on the educational track that best serves their career goals.

Undergraduate Program

Adviser
261 Meany, Box 351150
206-543-0550
uwdance@u.washington.edu

The Dance Program offers the following programs of study:

- * The Bachelor of Arts degree with a major in dance.
- * A minor in dance.

Bachelor of Arts

Program Admission Requirements

Application deadline (transcript and essay) is March 1. Acceptance is during spring quarter for autumn quarter admission and coursework planning.

1. Unofficial transcript
2. Two-page (maximum) essay. Applicants write on one of four topics. Details regarding essay topics and format are available from the Dance Program Web site, or at the Dance Program Office.
3. Two-hour technique assessment class prior to the beginning of spring quarter (date and time are posted on the program Web site). Prospective applicants unable to attend this assessment class should contact the Dance Program adviser to make alternate arrangement.

For additional information regarding application procedure and time/date/location of the spring-quarter assessment class, contact the Dance Program adviser or visit the Dance Program Web site.

Major Requirements

Minimum 65 credits in dance as follows:

1. *Core Curriculum Courses:* DANCE 166 (5 credits), DANCE 242 (3), DANCE 250 (3), DANCE 270 (2 credits, 1 crew minimum), DANCE 344 or DANCE 345 (5), DANCE 390 (5), DANCE 480 (3), DANCE 493 (5). (31 credits)
2. *28 credits from the following (12 credit minimum at the 200-level or above; 6 credits minimum in both ballet and modern dance):* DANCE 102, DANCE 103, DANCE 104, DANCE 105, DANCE 106, DANCE 107, DANCE 108, DANCE 109, DANCE 110, DANCE 111, DANCE 112, DANCE 201, DANCE 202, DANCE 203, DANCE 204, DANCE 205, DANCE 206, DANCE 210, DANCE 211, DANCE 212, DANCE 230, DANCE 301, DANCE 302, DANCE 303, DANCE 304, DANCE 305, DANCE 306, DANCE 310, DANCE 311, DANCE 312, DANCE 401, DANCE 402, DANCE 403, DANCE 404, DANCE 405, DANCE 406.
3. *Minimum of two courses from the following dance electives:* DANCE 234, DANCE 266, DANCE 366, DANCE 371, DANCE 420, DANCE 490. Up to 4 additional credits of DANCE 270 may be taken as electives and count toward completion of the dance major (minimum 6 credits).

Minor

Minor Requirements: Minimum 25 credits to include 10 credits from DANCE 166, DANCE 234, DANCE 250, DANCE 270, DANCE 344, DANCE 345, DANCE 390, DANCE 420, DANCE 490, DANCE 493; and 15 credits from DANCE 102, DANCE 103, DANCE 104, DANCE 105, DANCE 106, DANCE 107, DANCE 108, DANCE 109, DANCE 110, DANCE 111, DANCE 112, DANCE 201, DANCE 202, DANCE 203, DANCE 204, DANCE 205, DANCE 206, DANCE 210, DANCE 211, DANCE 212, DANCE 230, DANCE 301, DANCE 302, DANCE 303, DANCE 304, DANCE 305, DANCE 306, DANCE 310, DANCE 311, DANCE 312, DANCE 401, DANCE 402, DANCE 403, DANCE 404, DANCE 405, DANCE 406.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The Dance Program curriculum provides a balance between academic rigor and artistic development and serves as a basis for a broad range of career choices. Majors are encouraged to supplement their dance studies with coursework in other disciplines that provide a foundation for later specialization in dance ethnology, dance history and criticism, performance art, education, movement therapy, or movement science.
- * *Instructional and Research Facilities:* Three spacious and well equipped dance studios in Meany Hall. Use of Meany Hall and the Meany Studio Theatre for Dance Program performances.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* See adviser.
- * *Department Scholarships:* See adviser.
- * *Student Organizations/Associations:* Dance Student Association, University Ballet Company

Graduate Program

Graduate Program Coordinator
258 Meany, Box 351150
206-543-5594
uwdance@u.washington.edu

The dance program offers graduate study leading to a Master of Fine Arts degree. This program is designed specifically for professional dance performers who wish to prepare for a transition into college teaching careers. All graduate students will comprise the Chamber Dance Company and will hold teaching assistantships.

Master of Fine Arts

Admission Requirements

1. A letter of application and resume.
2. An undergraduate degree.
3. A minimum of eight years of professional performing experience.
4. The ability to demonstrate movement skills at a professional level in at least one idiom, and an in-person audition or performance video tape.
5. Three letters of reference verifying success and responsibility in the professional dance arena. Neither a foreign language nor the Graduate Record Examination is required. Application deadline is January 15.

Degree Requirements

During the two-year program, a student will be expected to enroll full-time (minimum of 10 credits/quarter) for three quarters each year (summer quarter excluded). A student must complete at least 72 credits in order to earn the degree, 31 of which are in required courses.

- * *Required Coursework:* Either PHIL 445 (5) or PHIL 446 (5); DANCE 510 (3), DANCE 515 (3), DANCE 520 (3), DANCE 521 (3), DANCE 530 (2), DANCE 531 (3), DANCE 595 (3)
- * *Coursework or Competency:* Students must have taken the following courses as an undergraduate, or have mastered the content of the following courses through practical experience, or complete these courses during their two years in the program: DANCE 420 (3), DANCE 493 (3-5), DANCE 544 (3-5), DANCE 545 (3-5), DANCE 590 (3-5)

Financial Aid

All graduate students will receive tuition waivers and teaching assistant stipends.

Course Descriptions

See page 325.

Digital Arts and Experimental Media

207 Raitt

The processes of inquiry encompassing imagination, exploration, discovery, and reflection are universal among artists, scholars, scientists, and engineers. All seek to uncover new knowledge through innovations that will improve our lives and communicate new ways of understanding ourselves and the universe. The Center for Digital Arts and Experimental Media (DXARTS) is a creative research convergence zone for intrepid artists and scholars who are pioneers of an unfolding new era in the arts.

The DXARTS program embraces an expansive range of arts practice, theory, and research across multiple disciplines. The center is home to its own undergraduate and graduate degree programs, but welcomes into its facilities and courses many who are not directly affiliated with one of these programs. Faculty and students at DXARTS may focus their work in a particular area of experimental arts (digital video, digital media art, computer music and sound art, computer animation, design computing, mechatronics, and so on), or they may pursue areas of creative research that have no media allegiance overlapping with and drawing from several or many different areas. Whatever the case, artists and scholars working at DXARTS engage in teaching, learning, and research within the synergistic, multidisciplinary setting of the center's labs, studios, and classrooms.

A common thread running through all of the work at DXARTS is the implicit maxim that to discover new knowledge we must challenge all assumptions. DXARTS is a place where the ideas and outcomes of creative arts research are in an ongoing state of becoming.

Undergraduate Program

Adviser
207 Raitt Hall, Box 353414
206-543-4218
dxarts@u.washington.edu

The DXARTS program offers the following program of study:

- * The Bachelor of Fine Arts degree with a major in digital arts and experimental media

Bachelor of Fine Arts

Program Admission Requirements

Admission is once a year. Application, normally during the sophomore year, is made during winter quarter for admission in spring. Admission is competitive. A minimum 2.50 GPA guarantees consideration, but the GPA of accepted applicants is normally considerably higher.

All applicants, regardless of background and proposed course of study, will be expected to show a significant level of computing skill and general technology literacy.

Students must enroll in DXARTS 200 autumn quarter. Based on performance in DXARTS 200, students are selected to continue in DXARTS 201 winter quarter. Students enrolled in DXARTS 201 are eligible to submit an application and supplemental materials to be considered for admission spring quarter. Supplemental materials include an electronic portfolio, a statement of interest in the program, and a proposed course-of-study plan. For details, see the program's Web page. Students must complete the following prior to application:

1. CSE 142
2. PHYS 114 or PHYS 121
3. MUSIC 120
4. ART H 203
5. Mathematics proficiency through the pre-calculus level. Proficiency may be demonstrated by completion of MATH 120 or equivalent, a minimum score of 68% on the UW Advanced Mathematics placement test, a minimum score of 2 on the mathematics AP exam, or completion of a college-level calculus course.

Major Requirements

In addition to the courses required for admission as described above, major requirements include the following:

1. 64-74 credits of DXARTS courses, as follows:
 - a. DXARTS 202 (5 credits)
 - b. Three quarters of DXARTS 400 (6 credits total)
 - c. DXARTS 412 (3 credits)
 - d. Completion of two of the following four DXARTS core sequences (30 credits): DXARTS 441, DXARTS 442, DXARTS 443 (3D Motion and Graphics); DXARTS 451, DXARTS 452, DXARTS 453 (Video); DXARTS 461, DXARTS 462, DXARTS 463 (Sound); DXARTS 471, DXARTS 472, DXARTS 473 (Mechatronics).
 - e. Completion of a third core sequence as listed above or one of the following fundamentals courses dealing with a third content area (5 to 15 credits): DXARTS 440, DXARTS 450, DXARTS 460, or DXARTS 470.
 - f. Senior thesis in the form of 15 credits of DXARTS 491, DXARTS 492, and DXARTS 493, including the completion and exhibition of a BFA thesis project that is a significant and original contribution both aesthetically and technically.
2. 20-30 credits in additional DXARTS courses, or courses from a list of approved electives in other areas, to bring total major credits to 94. See department website or advising office for a list of approved electives.
3. A minimum 2.0 grade in all DXARTS courses counted toward the major. A cumulative GPA of 2.50 in all DXARTS courses and approved electives.
4. For complete information about the BFA program visit the program's Web page.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The program goal is to create opportunities for entering artists to discover and document new knowledge and expertise. Unlike other BFA degrees, which offer initial professional studio art education, this BFA is primarily a pre-graduate, research-oriented degree, signifying that an individual is professionally qualified to investigate fundamental problems in the nature and practice of digital arts and experimental media. Graduates are prepared to pursue original creative and technical research in the field and contribute to the development of knowledge and its consequences in society and culture.
- * *Instructional and Research Facilities:* DXARTS houses extensive laboratories and advanced research studios with state-of-the-art computing, imaging, sound, networking, mechatronics, and electronics equipment to support a wide range of experimental art.
- * *Honors Options Available:* None.
- * *Research, Internships, and Service Learning:* Some areas of research and professional opportunities within DXARTS include digital video art, computer music composition, Web site design and programming, 3D animation, motion graphics design, user interface design, sound design, interactive media production, multimedia art, electronic stage and set design, authoring of electronic online publications, special effects design, virtual environment design, sound art, and installations art (in galleries, public, and virtual spaces).
- * *Department Scholarships:* Limited in number with competitive application processes. Please see adviser for details.
- * *Student Organizations/Associations:* None.

Graduate Program

Graduate Program Coordinator
207 Raitt Hall, Box 353414
206-543-4218
dxarts@u.washington.edu

Doctor of Philosophy

The goal of doctoral education in Digital Arts and Experimental Media is to create opportunities for artists to discover and document new knowledge and expertise at the most advanced levels higher education can offer. While creating new art is at the center of all activities in the program, the DXARTS Ph.D. is a research-oriented degree requiring a substantial commitment to graduate-level study and reflection. The Ph.D. degree prepares artists to

pursue original creative and technical research in digital arts and experimental media and pioneer lasting innovations on which future artists and scholars can build.

Admission Requirements

- * Master's degree or equivalent in a discipline or field related to the proposed doctoral work.
- * Portfolio of artistic work.
- * Statement of purpose
- * Competence in computing, general technology literacy, and skill and imagination in the applicant's areas of interest.
- * One copy of the Graduate School's Application Form
- * One sealed official transcript from each collegiate institution attended.
- * A digitally based portfolio of artistic work including any other documentation that can help the admissions committee make its evaluations. The portfolio should be thoughtfully organized in a digital format (CDROM, DVD, URL, etc.) that best represents the applicant's work. Non-digital supplemental materials should be included in the index on the digital portfolio.
- * A complete curriculum vitae and narrative biography
- * Three letters of recommendation from instructors or professors familiar with the applicant's academic qualifications
- * International applicants must submit TOEFL and TSE scores

Degree Requirements

90 credits, as follows:

- * Prior to the General Examination which concludes Phase Two of the program, six quarters of full-time study (minimum of 10 credits per quarter). DXARTS 500 is required every quarter.
- * 60 credits of DXARTS approved courses (not including DXARTS 800 credits). At least 30 of the credits earned must be at the 500 level. At least 30 must be in graded 400- and 500-level courses.
- * Minimum 3.00 GPA in DXARTS courses.
- * General Examination
- * Final Project - a substantial and original contribution in both artistic and technical domains. At least 27 credits of DXARTS 800 over a period of at least three quarters before taking the Final Doctoral Exam.
- * Two-part Final Exam. Registration as a doctoral student is required during the quarter the exam is taken.

Course Descriptions

See page 327.

Drama

101 Hutchinson

Drama as an art form is a far-reaching discipline providing a humanistic approach to today's societal problems and issues. Drama wrestles with the most compelling issues of our time, to derive new understanding for the advancement of the human condition. It also fosters curiosity, invention, bravery, and humor, promoting practical innovation and personal revelation as lifelong habits of the artist.

Through mastery of skills and techniques, people in drama nurture imagination, seek inspiration and fluent, authentic, original storytelling that reflects the complexity of the human spirit.

Undergraduate Program

Adviser
129 Hutchinson Hall, Box 353950
206-543-4204
uwdrama@u.washington.edu

The School of Drama offers the following program of study:

- * The Bachelor of Arts degree with a major in drama

Bachelor of Arts

Suggested First- and Second-Year College Courses: See department admission requirements below.

Department Admission Requirements

DRAMA 251 and DRAMA 302; two of the following: DRAMA 210, DRAMA 211, DRAMA 212; one of the following: DRAMA 290, DRAMA 291, DRAMA 292; and a minimum GPA of 2.50 for the five courses.

No audition is required to enter the program.

Major Requirements

62 credits as follows:

1. DRAMA 251, DRAMA 252, DRAMA 253: Beginning Acting Series (12 credits)
2. DRAMA 210: Scenic Design and Construction (4 credits)
3. DRAMA 211: Costume Design and Construction (4 credits)
4. DRAMA 212: Stage Lighting (4 credits)
5. DRAMA 290, DRAMA 291, DRAMA 292: Mainstage Crew, (1-3 credits each)
6. DRAMA 302: Analysis of the Theatre (5 credits)
7. One course from the following: DRAMA 374, DRAMA 377, DRAMA 378, DRAMA 471, DRAMA 472 (5 credits)
8. One course from the following: DRAMA 473, DRAMA 475, DRAMA 476 (5 credits)
9. One course from the following: DRAMA 371, DRAMA 373, DRAMA 416, DRAMA 494 (5 credits)
10. One additional course from the above three groups (5 credits)
11. 300- and 400-level drama electives (10 credits)
12. 1 credit of DRAMA 401

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The faculty of the School of Drama considers the optimum preparation for the theatre artist to be comprised of a liberal arts undergraduate major in drama and a graduate conservatory education.

Learning objectives include enriched artistic expression, a foundation for further study, and cultivation of essential life skills: teamwork, communication, critical thinking, and imagination.

Students earning the Bachelor of Arts in drama are prepared to seek employment in the theatre industry, apply for advanced degrees in a specific area of theatre (e.g., MFA in acting or design) or transfer the skills gained through the program to broader career opportunities. Recent graduates have pursued careers in acting, design, directing, technical direction, stage management, dramaturgy, playwriting, literary management, teaching, and in such non-theatre occupations as real estate agent, fund-raiser, public relations staff, politician, librarian, academic counselor, lawyer, nurse, translator of foreign films, admissions counselor, trade show/convention production assistant, talent agent, casting director, music promoter, special events coordinator, tour guide, human resources coordinator, wedding coordinator, aerobics instructor, music promoter.

- * *Instructional and Research Facilities:* Rehearsal and performance spaces include the Glenn Hughes Penthouse Theatre (the first theatre-in-the-round built in the United States), the thrust-stage Playhouse Theatre, the end-stage Meany Studio Theatre, and the proscenium in Meany Hall. Other spaces include the Cabaret, Studio 201, and Hutchinson 218. School of Drama facilities include a Design Studio, Costume Shop, Scene Shop, and computer labs.

The Drama Library houses reserve books, plays, sound effects, dialect tapes, local audition and job notices, and a special collection of acting editions. Also available are specialized indexes and theatre databases. The librarian assists in the use of reference materials and indexes, bibliographic searches of on-line databases, and offers reference service and bibliographic instruction sessions for groups and individuals.

- * *Honors Options Available:* Ad hoc honors only. See adviser for details.
- * *Research, Internships and Service Learning:* Student participation in all aspects of dramatic art is provided through student productions, and faculty- and student-directed plays drawn from the full range of world dramatic literature and produced throughout the year. The School also produces operas in association with the School of Music

To enhance employability and gain hands-on experience, students are encouraged to participate in internships with regional theatres, and related organizations or businesses. Academic credit may be earned for

internships under the course number GEN ST 350. Internship credits count toward non-major elective credits to graduate. A resource guide to drama-related internships is available at the drama undergraduate advising homepage.

Drama students are also encouraged to apply for undergraduate research, leadership and/or fellowship grants available through the Mary Gates Endowment.

- * *Department Scholarships:* School of Drama scholarships are awarded annually every spring for the following academic year to students who have demonstrated academic merit and contributed significantly to the School of Drama. Applications are available from the advising office mid-January.
- * *Student Organizations/Associations:* The Undergraduate Theatrical Society (UTS) is a student organization that produces undergraduate theatre works in the Cabaret performance space. Any UW student may audition for UTS productions. UTS members also participate in annual New Student Orientation and other school events on a volunteer basis.

A volunteer elected group of drama students, the BA Council, meets regularly with the Executive Director of the School of Drama to discuss issues relative to the undergraduate program.

Of Special Note:

Continuation Policy: Drama majors who fall below a 2.00 GPA in drama courses will be placed on academic probation for one quarter. Students who fail to raise their GPA to 2.00 in that time are dropped from the major and returned to premajor status. Students may petition the School of Drama for readmission.

Graduate Program

Graduate Program Coordinator
101 Hutchinson, Box 353950
206-543-5140
uwdrama@u.washington.edu

The School of Drama offers professional training and scholarly programs leading to the Master of Fine Arts (M.F.A.) and Doctor of Philosophy (Ph.D.) degrees. Areas of study for the M.F.A. degree are acting, stage direction, scene design, lighting design, and costume design. Most students should expect to spend three intensive years completing the requirements for the M.F.A. degree.

The Ph.D. program provides students with training for scholarly research in theatre history, dramatic literature, theory, and criticism. Students are also encouraged to do interdisciplinary work with such allied programs as the Ph.D. program in critical theory.

Master of Fine Arts -- Acting

Admission Requirements

Admission is based on a private fifteen minute audition and interview with the head of the Professional Actor Training Program (PATP).

Applicants should prepare the following:

- * A two-minute monologue from a modern prose play.
- * A two-minute Shakespearean verse monologue.
- * Approximately 16 bars of a song, a cappella or with auditioner-provided accompaniment.
- * Auditioners should also be ready to detail their previous training.

Students who hold (or will hold by the time they enroll) a baccalaureate degree from an accredited institution may apply. Most applicants have undergraduate degrees in theatre, but it is not essential. All applicants must demonstrate outstanding talent to be admitted. The GRE is not required. International applicants must meet the minimum TOEFL and TSE scores and other requirements listed on the PEP.

Applicants must submit the following to Graduate Programs, School of Drama, University of Washington, Box 353950, Seattle, WA 98195-3950:

- * The School of Drama PATP application form (available for download from the School's web site) with the preferred audition date indicated.
- * A \$40.00 (non-refundable) audition fee, payable by check or money order

to the School of Drama. Applications postmarked after the deadline must include a late application fee of \$10.00 (\$50.00 total). Please note, this is a separate fee from the one due to the Office of Graduate Admissions.

- * A photograph.
- * A current résumé of training and experience in the applicant's field.
- * One set of official transcripts.
- * A statement of purpose including educational and professional goals.
- * Three letters of recommendation.
- * A copy of the Application for Admission to the Graduate School.

Degree Requirements

A group of ten students enrolls each autumn quarter for the three-year program. In addition to performing in studio productions, first-year students join the acting pool in the winter quarter and, together with second and third-year students, perform in the School of Drama mainstage subscription season, directed by faculty, guest professionals supervised M.F.A. students in the directing program.

The studio classes include extensive work on Stanislavski based process, Suzuki training, voice (Linklater based), singing, speech (Skinner-based), stage combat (for certification), dance, trapeze and audition work. The Alexander technique is both taught as a class and is woven throughout most studio classes and productions.

Throughout the year PATP students have opportunities to audition for summer theatre festivals from around the region and country. We also maintain productive relationships with professional theatres in Seattle and the region such as the Seattle Repertory Theatre, Intiman, Empty Space, ACT, Seattle Children's Theatre, The Guthrie Theatre and the Oregon Shakespeare Festival.

In their third year, PATP students take an in depth class on "the business of acting" as well as an intensive course in acting for the camera. They rehearse and perform in a third year ensemble show with an outside professional director, create a twenty-minute solo performance of their own design and with the faculty develop a professional showcase that plays in Seattle, Los Angeles and New York.

All PATP students are evaluated by the acting faculty at the end of each quarter. Students are admitted with the expectation that all will graduate, although dismissal is possible given two unsatisfactory critiques.

Required coursework is 90 credits as follows:

- * 36 credits of DRAMA 557 (12, max. 36)
- * 36 credits of DRAMA 558 (12, max. 36)
- * DRAMA 551 (1-3, max. 3)
- * DRAMA 552 (1-3, max. 3)
- * DRAMA 553 (1-3, max. 3)
- * 6 credits of DRAMA 559 (6, max. 18)
- * 9 credits of DRAMA 700 (1, max. 9)

Master of Fine Arts -- Directing

Admission Requirements

This program accepts only two MFA candidates every other year. While there is always room for the exceptional applicant, it is extremely difficult to gain admission directly out of a B.A. program with no other credentials. The program tends to choose candidates who show evidence of enterprising energy and accomplishment "out in the world," who may have successfully assisted seasoned directors, who have at least the beginning of a professional and artistic record.

1. All Applicants
 - a. Applicants submit the following to Graduate Programs, School of Drama, Box 353950, Seattle WA 98195-3950:
 - i. The separate Directing application form (available for download from the School's Web site and \$35 fee, made payable to the School of Drama. This fee is separate from that due to the Office of Graduate Admissions (see B below).
 - ii. A current résumé of training and experience in your field.
 - iii. A statement of purpose including educational and professional goals.
 - iv. Three letters of recommendation.
 - v. A copy of the Application for Admission to the Graduate School.
 - vi. One set of official transcripts.
 - vii. A directorial analysis of a play or opera chosen from a preselected list (current list will be in packet).

The résumé of theatre activity, statement of purpose and letters of recommendation are all important. The three letters of recommendation should not come from the same source (e.g., the student's B.A. program's faculty). Students may include a video (not required). If you want the video returned, please include a self-addressed stamped envelope for that purpose.

- b. All applicants for graduate study at the UW must also apply to the Office of Graduate Admissions. The GRE is not required for any applicant. International applicants must meet minimum TOEFL and TSE scores and other requirements as listed on the PEP, <http://www.grad.washington.edu/admissions/intl/intlmain.htm> and should apply by November 1.

2. Second step for selected applicants

A short list of candidates (12-16) will be invited to continue the application process and interview. Candidates are normally given a minimum three weeks' notice and should be prepared to cover travel costs and one to two nights' lodging.

- a. Candidates will interview for 30 minutes with the head of the program and another faculty member of the program.
- b. Candidates will present a two-minute monologue as a way of revealing, not acting talent but the candidate's knowledge of what it is to speak dialogue, transmit thoughts and physically relate to space.
- c. Candidates will be asked to respond to a two-page questionnaire provided by the School of Drama.

3. Third step for final short listed applicants

A small group of four to eight candidates will be invited to Seattle where they will be interviewed in person by a group of faculty. As part of this interview each candidate will conduct a rehearsal of one of three pre-selected scenes with actors provided by the School of Drama. These actors will be familiar with the material and ready to be on their feet. Candidates will receive the scene options and any additional information when they are notified of their selection to this short list.

Degree Requirements

Coursework:

90 credits, to include the following:

- * 14 credits of DRAMA 563 (2, max. 18)
- * 18 credits of DRAMA 567 (1-3, max. 12)
- * Electives chosen from DRAMA 419 (3, max. 9), DRAMA 510 (3, max. 18), DRAMA 560 (2), DRAMA 561 (2-3, max. 12), DRAMA 562 (1-3, max. 12), and DRAMA 569 (3)
- * 9 credits of DRAMA 700

Additional Coursework: After discussions with each student the faculty may advise additional coursework in such areas as Alexander technique, dialects, lighting design, combat, literature, or history of styles and costume.

All students are evaluated by all of the contact faculty each quarter.

Internships: One quarter of the program is devoted to a professional internship experience. MFA directors may intern either locally, nationally or internationally during winter or spring quarter of the third year.

Master of Arts -- Design

Admission Requirements

Applicants to the Design program must submit a portfolio representative of their work and interview with Design faculty. They may mail the portfolio to the School of Drama and interview with a faculty member on the phone. It is always preferable for the applicant to bring it with them when they visit Seattle to interview with Design Faculty and sit in on graduate design classes. Other required application materials and fees are detailed below.

The program generally accepts two students in each area every year. While there is always room for the exceptional applicant, it is extremely difficult to gain admission directly out of a BA/BFA program with no other credentials.

Interviews: A personal interview is highly recommended, preferably in Seattle. Interviews are held in Seattle from mid-January to the beginning of March, with a limited number scheduled each week. Interviews are held when possible on Wednesday afternoons and applicants are invited to visit

classes Wednesday morning. Please fill out the MFA Design application form completely and indicate how and when you plan to both submit your portfolio and interview with faculty.

Portfolios: Portfolio materials need not be matted nor in a presentation case. The portfolio may include hand drafting, renderings, photographs of realized work or of models, costume sketches and other graphic work or high quality photocopies of same, blue lines and/or duplicate slides. Work should be presented in chronological order and should demonstrate strong graphic skills (including accurate rendering of the human figure) and the ability to devise effective design solutions to the problems posed by a script. It is particularly desirable for the portfolio to include examples of drawing or painting not intended as theatre design projects: figure drawing, landscape, architectural sketching or lighting, lighting installations, etc. Again, high quality photocopies are acceptable.

For lighting design applicants, the portfolio should include examples of hand or computer drafting, two or more complete projects including a one-page statement of conceptual approach, hook-up, plot and cue ideas. It should also include samples of set sketches and life drawing.

Application Procedures: Applicants submit material to both the Office of Graduate Admissions and the School of Drama. If you have any questions about the application procedure, please contact the School of Drama's graduate program assistant at (206)543-0714 or email uwdrama@u.washington.edu.

The GRE is not required for any applicant. International applicants must meet minimum TOEFL and TSE scores and other requirements as listed on the PEP.

1. Submit the following to Graduate Programs, School of Drama, Box 353950, Seattle WA 98195-3950:
 - a. Your portfolio (you can bring this with you if you interview in Seattle).
 - b. The separate Design application form (available for download from the School's web site) and \$35 fee. Please note, this fee is separate from the one due to the Office of Graduate Admissions (B below).
 - c. A current résumé of training and experience in your field.
 - d. Three letters of recommendation.
 - e. A statement of purpose including educational and professional goals.
 - f. A copy of the Application for Admission to the Graduate School.
 - g. One set of official transcripts.
2. All applicants for graduate study at the UW must also apply to the Office of Graduate Admissions.

Degree Requirements

The MFA program is three years in length, requiring 90 credits of course work. The first two years are devoted to class and studio work and production projects. In the third year, students complete an internship with a professional theatre before returning to the School of Drama for one quarter for a final thesis project. The program of study is intended to give the student the basic skills needed to work productively in his/her area of interest and to help the student develop his/her own individual artistic vision. The core of the program is a group of classes and seminars that bring designers and directors together to discuss the creation of works for the stage. Other studio and skills courses develop proficiency. Specific courses vary depending on design emphasis. Professionals working in Seattle are regularly invited to attend classes and offer critiques or discuss their work. Students regularly assist faculty on outside projects.

Scenic Design: Students in scenic design are expected to acquire acceptable proficiency in drawing and painting, drafting, model building, scene painting and scene and property construction through a rigorous succession of studio assignments and actual production work.

Costume Design: This course of study emphasizes the aesthetic as well as intellectual analysis of theatrical or operatic texts and how one turns these impulses into three dimensional, unified designs. Students will have intensive exposure to this process as they are mentored through the production of their designs as well as through classes, which encompass design, construction, graphic skills, and history.

Lighting Design: The lighting design program emphasizes communication with the director and other designers and a complete understanding of the lighting design process. In advanced studio courses, students work in a light lab, in the School's various theatres, as well as site-specific venues encountering specific lighting challenges. Designing and assisting for UW and off-campus productions is an important part of the program. Lighting students study set and costume design in studio class as well.

Doctor of Philosophy

Admission Requirements

Preference is given to applicants with M.A./M.F.A. degrees and theatre experience but those who hold a baccalaureate degree from an accredited college or university are eligible to apply.

- * An essay or thesis chapter representative of the applicant's best scholarly work.
- * Graduate Record Examination (GRE) test scores.
- * A current résumé of training and experience in your field.
- * A statement of purpose including educational and professional goals.
- * Three letters of recommendation. Each recommendation must state whether the letter is or is not available for review by the applicant. Forms for this purpose are available for download from the School's web site (<http://depts.washington.edu/uwdrama>). These letters of recommendation should evaluate the applicant's skills and accomplishments as a theatre artist and his or her potential for graduate study in theatre history, dramatic theory and criticism.
- * A copy of the Application for Admission to the Graduate School.
- * One set of official transcripts.
- * All applicants for graduate study at the UW must also apply to the Office of Graduate Admissions.

International applications must meet minimum TOEFL and TSE scores and other requirements as listed on the PEP.

Degree Requirements

Coursework within the School consists of three years of study, 99 credits of coursework, including a sequence of 18 seminars (nine in history and nine in theory) and annual examinations. These linked courses provide complete preparation in the major issues of historical study and contemporary critical practice. Students also enroll in a minimum of three courses outside the School of Drama and must complete an upper level reading course in a foreign language. Specific course work includes DRAMA 571, DRAMA 572, DRAMA 573, DRAMA 575, DRAMA 576, DRAMA 577, DRAMA 581, DRAMA 582, DRAMA 583, DRAMA 585, DRAMA 586, and DRAMA 587, as well as 30 credits of DRAMA 800.

The sequence of drama seminars reflects the changing needs of students, the developing research of the faculty and the conditions of contemporary scholarship. Special topics in the history sequence have included Restoration theatre, drama in the Industrial Age, communism and capitalism, and ancient theatre history. Seminars in criticism have included reading, interpretation and performance; mimesis and theatrical representation; the semiotics of theatre; and drama and Marxist theatre theory. Students are encouraged to develop original research in these seminars and to present their work at professional meetings or publish it in academic journals.

The fourth year of the program is devoted to writing a dissertation under the guidance of a faculty advisor. Recent doctoral dissertations have explored semiotics, feminism, American theatre history, contemporary English and German drama, ethnicity and performance theory.

Course Descriptions

See page 328.

Earth and Space Sciences

310 Condon Hall

Earth and space sciences seeks to further the understanding of the Earth, the solar system, and their histories. The scope extends from the center of Earth to the rim of the solar system, and activities cut across traditional disciplines of physics, chemistry, biology, geology, and mathematics. The discipline examines Earth's interior structure, chemistry, motion, and dynamics; geologic hazards; processes affecting the surface environment and climate; the surrounding space environment; planetary processes; and geobiology.

Undergraduate Program

Adviser
310 Condon Hall, Box 351310
206-616-8511
advising@ess.washington.edu

The Department of Earth and Space Sciences offers the following programs of study:

- * The Bachelor of Science degree with a major in earth and space sciences, with options in biology and physics
- * The Bachelor of Arts degree with a major in earth and space sciences
- * A minor in earth and space sciences

The Bachelor of Science degree is designed for students interested in geology and geophysics, and a career path in graduate studies or in the private sector, where field and technology experiences and problem-solving skills are an important asset. The Biology Option enables B.S. students interested in paleontology and paleobiology to emphasize biology courses. The Physics Option allows for an emphasis in physics and geophysics. The Bachelor of Arts degree is designed for students who wish to obtain a broad understanding of earth sciences as a background for careers such as science journalism, environmental law, K-12 teaching, or environmental policy.

Bachelor of Science

Suggested First- and Second-Year Courses: MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122, PHYS 123 or PHYS 114/PHYS 117, PHYS 115/PHYS 118, PHYS 116/PHYS 119; CHEM 142.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

90 credits as follows:

1. Science Core (35 Credits):
 - a. Basic Supporting Science (20 credits): MATH 124, MATH 125 or equivalent; PHYS 114/PHYS 117 or PHYS 121; CHEM 142. (Students wishing to pursue the ESS Physics Option must take PHYS 121.)
 - b. ESS Required Core Courses (15 credits): ESS 211, ESS 212, ESS 213. (Students in the ESS Physics Option may substitute ESS 205 for one of these.)
2. ESS Options (55 Credits):
 - a. Standard Option.
 - i. Supporting science (13-15 credits): MATH 126 or equivalent; PHYS 115/PHYS 118 or PHYS 122; and one of PHYS 116/PHYS 119 or PHYS 123, CHEM 152, MATH 307, MATH 308, STAT 311.
 - ii. ESS required (22 credits): Two of ESS 311, ESS 312, ESS 313, ESS 314; ESS 400 or equivalent field/experiential component.
 - iii. ESS electives (18-20 credits): ESS 400-level courses or any ESS 311-series course not taken as a required course, above. (May not include independent study or seminar courses numbered 490 through 499.)
 - b. Biology Option.
 - i. Supporting science (21 credits): CHEM 152, CHEM 162 or equivalent; BIOL 180, BIOL 200 (or two from BIOL 201, BIOL 202, BIOL 203); MATH 126 recommended but not required.
 - ii. ESS required (22 credits): Two of ESS 311, ESS 312, ESS 313, ESS 314; ESS 400 or equivalent field/experiential component.
 - iii. ESS electives (12 credits): ESS 400-level courses or any ESS 311-series course not taken as a required course, above. (May not include independent study or seminar courses numbered 490 through 499.)
 - c. Environmental Earth Sciences Option
 - i. Supporting science (10 credits): STAT 311 or Q SCI 381; CHEM 152 or CHEM 220.
 - ii. ESS required (35 to 37 credits): ESS 201; one of ESS 311, ESS 312, ESS 313, ESS 314, ESS 326; two from ESS 315, ESS 421, ESS 426, ESS 427, ESS 455, ESS 456, ESS 459; ESS 400 or equivalent field/experiential component.
 - iii. Electives (10 credits): Additional courses chosen from any ESS 311-series course not taken as a required course above, from ESS 400-level courses (may not include independent study or seminar courses numbered 490 through 499), or from an approved list of courses outside ESS.

- d. Physics Option
 - i. Supporting science (32-35 credits): MATH 126, MATH 308, MATH 324 or MATH 136, MATH 324; PHYS 122, PHYS 123, PHYS 227, PHYS 228, PHYS 321, PHYS 322.
 - ii. ESS required (5 credits): One of ESS 311, ESS 312, ESS 313, ESS 314.
 - iii. ESS electives (15-18 credits): ESS 400-level courses or any ESS 311-series course not taken as a required course, above. (May not include independent study or seminar courses numbered 490 through 499.)

All courses counted toward the major must be completed with a minimum grade of 2.0.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Q SCI 291, Q 292 or MATH 124, MATH 125; PHYS 114/PHYS 117 or PHYS 121; CHEM 142.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

90 credits as follows:

1. Supporting Science (35 Credits):
 - a. Basic Supporting Science (20 credits): CHEM 142; Q SCI 291, Q SCI 292 or MATH 124, MATH 125 or equivalent; PHYS 114/PHYS 117 or PHYS 121.
 - b. Additional courses: 15 credits from department's approved list of courses in science and mathematics. See adviser for current list.
2. ESS Courses (55 Credits):
 - a. Required courses (15 credits): Two of ESS 211, ESS 212, ESS 213. One of ESS 311, ESS 312, ESS 313, ESS 314.
 - b. Elective Courses: 40 upper division credits (300- and 400-level) with at least 10 credits at the 400-level. (May not include independent study or seminar courses numbered 490 through 499.)
3. All courses must be completed with a minimum grade of 2.0

Minor

Minor Requirements: 30 ESS credits with at least 15 at the upper division level (300- or 400-level) of which at least 3 credits must be at the 400-level. (May not include independent study or seminar courses numbered 490 through 499.) All courses must be completed with a minimum grade of 2.0.

Student Outcomes and Opportunities

- * *Instructional and Research Facilities:* See below.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser or department Web site for requirements.
- * *Research, Internships, and Service Learning:* Job and internship possibilities are posted in the department and forwarded by email to all undergraduate students.
- * *Department Scholarships:* There are a limited number of departmental scholarships available. Scholarship applications are invited from all undergraduate students in the major during spring quarter. The awards are applicable to the following academic year.
- * *Student Organizations/Associations:* Geo Club organizes field trips and social gatherings. Information about meetings and events is forwarded to undergraduate majors by email.

Graduate Program

Graduate Program Coordinator
310 Condon Hall, Box 351310
206-543-1190
advising@ess.washington.edu

The Department of Earth and Space Sciences offers graduate programs leading to the Master of Science (M.S.) degree and the Doctor of Philosophy (Ph.D.) degree in both Geological Sciences and in Geophysics. The programs emphasize a rigorous quantitative approach in conjunction with detailed in-situ and/or laboratory observations to address significant problems that will lead to a better understanding of the Earth and its environment.

Major areas of interest are the internal and surface structures and materials of the Earth and planets, dynamic processes within the earth, oceans, atmosphere, and space environments, their history and the interaction of life with these environments. The required curriculum is flexible to facilitate interdisciplinary research approaches. The department is also one of the core departments (with the Departments of Atmospheric Sciences and Oceanography) in the interdisciplinary graduate Program on Climate Change and a participant in the Astrobiology program.

Master of Science

Admission Requirements

- * Copy of UW Graduate School Application Form. After applying online, print it out on paper, and send a copy signed and dated in ink.
- * Official test scores for the Graduate Record Exam (GRE) Note: TSE scores are not required.
- * Official TOEFL scores for international applicants
- * One copy of official transcripts of all colleges and universities attended, in sealed envelopes, if possible. International transcripts must be in the original language and accompanied by a certified English translation.
- * Three letters of recommendation on the department's Recommendation Form.
- * Departmental application form
- * Personal resume and personal statement (see instructions in departmental application)

Degree Requirements

36-45 credits, as follows:

As the Department of Earth and Space Sciences encourages interdisciplinary courses of study tailored to each student, there are few formal requirements for the M.S. or Ph.D. degrees beyond those specified by the Graduate School.

In addition, departmental requirements for graduate students in both geological sciences and geophysics include the following:

- * Courses determined in consultation with the student's advisory committee to insure both depth and breadth
- * ESS 594, each quarter of the first year
- * ESS 599, every quarter (except summer)
- * Prelim Exam (see below)

With Thesis: 36 credits, of which 18 must be in courses at the 400 level or above and up to 9 may be for thesis (ESS 700). Final examination consists of oral presentation and defense of thesis.

Without Thesis: 45 credits, of which 18 must be in courses at the 400 level or above, which includes a 5-credit research paper (ESS 600). Final examination is oral and is administered by a supervisory committee.

Prelim Exam: The Prelim Exam is a requirement of ESS for every graduate student in its program. It is only one component of the information the Department uses to evaluate admission to the Ph.D. program early in the second year of a student's graduate program. Along with the first-year research seminar sequence, the Prelim Exam is used to encourage students to learn how to develop and present a research project, and get an early, structured start on graduate research.

For the Prelim Exam a graduate student must demonstrate the ability to think critically, logically and creatively and to communicate effectively; and knowledge of the disciplines that underlie the student's general area of interest (e.g., geology, geophysics, physics, math, chemistry, biology, etc.)

All entering graduate students (both M.S. and Ph.D.) must present and defend a Research Proposal before a Student Evaluation Committee (SEC) at the end of their first year or at the beginning of their second year in the Department of Earth and Space Sciences.

Doctor of Philosophy

Admission Requirements

- * Copy of UW Graduate School Application Form. After applying online, print it out on paper, and send a copy signed and dated in ink.
- * Official test scores for the Graduate Record Exam (GRE) Note: TSE scores are not required.
- * Official TOEFL scores for international applicants

- * One copy of official transcripts of all colleges and universities attended, in sealed envelopes, if possible. International transcripts must be in the original language and accompanied by a certified English translation.
- * Three letters of recommendation on the department's Recommendation Form.
- * Departmental application form
- * Personal resume and personal statement (see instructions in departmental application)

Degree Requirements

90 credits, as follows:

As the Department of Earth and Space Sciences encourages interdisciplinary courses of study tailored to each student, there are few formal requirements for the M.S. or Ph.D. degrees beyond those specified by the Graduate School.

In addition, departmental requirements for graduate students in both geological sciences and geophysics include the following:

- * Courses determined in consultation with the student's advisory committee to insure both depth and breadth
- * ESS 594, each quarter of the first year
- * ESS 599, every quarter (except summer)
- * Prelim Exam (see below)

Prelim Exam: The Prelim Exam is a requirement of ESS for every graduate student in its program. It is only one component of the information the Department uses to evaluate admission to the Ph.D. program early in the second year of a student's graduate program. Along with the first-year research seminar sequence, the Prelim Exam is used to encourage students to learn how to develop and present a research project, and get an early, structured start on graduate research.

For the Prelim Exam a graduate student must demonstrate the ability to think critically, logically and creatively and to communicate effectively; and knowledge of the disciplines that underlie the student's general area of interest (e.g., geology, geophysics, physics, math, chemistry, biology, etc.)

All entering graduate students (both M.S. and Ph.D.) must present and defend a Research Proposal before a Student Evaluation Committee (SEC) at the end of their first year or at the beginning of their second year in the Department of Earth and Space Sciences.

Research Facilities

Extensive laboratory facilities are available for a wide range of experimental/field work. These include a wet chemistry laboratory, a JEOL 733 Superprobe with EDS/WDS and a high resolution laser Raman spectrometer for mineral analysis, a thermal-ionization mass spectrometer, a multi-collector inductively-coupled-plasma mass spectrometer and associated clean laboratories for analysis of stable and radiogenic isotopes, a computer laboratory, a remote-sensing laboratory with an image-processing system with LANDSAT tape library and spectral reflectance equipment, and high temperature controlled atmosphere furnaces. There is also field equipment for electromagnetic induction studies; a high-pressure/temperature laboratory, including a laser-induced phonon spectrometer and diamond anvil cells for studying such rock and mineral properties as compression, sound velocities, and thermal conductivity; a permanent, regional seismic network; a portable telemetered seismic network for studying volcanoes and active faults in western North America; geodetic-quality global-positioning-system receivers; a cold laboratory for studying problems in snow-cover geophysics, glaciology, and sea-ice research; a geophysical-fluids laboratory; two cloud microphysics laboratories; a space physics and aeronomy laboratory for preparing ground-based, balloon, rocket, and satellite experiments; and a laboratory for the study of advanced plasma propulsion concepts. Additional facilities are provided by the Quaternary Research Center (which houses state-of-the-art cosmogenic isotope and stable-isotope research laboratories, palynology, snow and ice research, and a periglacial laboratory) and the Burke Memorial Washington State Museum (which houses paleontological laboratories and extensive reference collections of invertebrate, vertebrate, and plant fossils, and minerals).

Financial Aid

Most graduate students receive support in the form of teaching or research assistantships, and endowed fellowships and scholarships.

Course Descriptions

See page 331.

Economics

302 Savery

Economics concerns the wealth of nations. As a social science, it studies the institutions and arrangements that societies use to create and allocate productive resources in order to increase the well being of their members. It advances understanding of the choices and behavior of individuals, households, firms, and other organizations.

Undergraduate Program

Advisers

304 Savery, Box 353330
206-543-5794
econadv@u.washington.edu

The Department of Economics offers the following programs of study:

- * The Bachelor of Arts degree with a major in economics
- * The Bachelor of Science degree with a major in economics

The Bachelor of Arts degree is designed to provide a general background in economics, and is the choice of the vast majority of departmental majors.

The Bachelor of Science degree requires more mathematics for admission, and its graduation requirements have a more pronounced quantitative emphasis.

Applied fields of study available include money and banking, industrial organization, natural resource economics, labor economics, public finance, economic history, comparative systems and development, international trade, and econometrics.

Bachelor of Arts

Suggested First- and Second-Year College Courses: ECON 200, ECON 201 and MATH 120, MATH 124 or MATH 111, MATH 112. Courses that develop strong analytical and quantitative-reasoning skills.

Department Admission Requirements

1. A minimum of 45 quarter credits completed, including ECON 200, ECON 201; STAT 311; MATH 112, MATH 124, MATH 134, or MATH 145;
2. A minimum cumulative GPA for all prior college work of 2.80;
3. GPA for five courses required for entrance must be at least 2.80 with a minimum of 2.0 in each course;
4. Transfer students must be enrolled at the UW before applying to the major;
5. Application deadline is the second Friday of each quarter (including summer). All applicants who meet the minimum admission requirements are admitted in time to register as economics majors for the following quarter.

Major Requirements

55 credits as follows:

1. Admission to the major.
2. A minimum of 50 credits in economics, including ECON 200, ECON 201, ECON 300, ECON 301, STAT 311, and at least five other upper-division courses in economics at the 400 level, excluding ECON 496, ECON 497, and ECON 499.
3. Grades of 2.0 or better in ECON 300 and 301.
4. One calculus course (MATH 112, MATH 124, MATH 134, MATH 145, or equivalent).
5. Transfer students are required to complete a minimum of 25 upper-division economics credits in residence at the UW.

Bachelor of Science

Suggested First- and Second-Year College Courses: ECON 200, ECON 201 and MATH 120, MATH 124 and STAT 311. Additional calculus

preparation during the first year is strongly recommended. Courses that develop strong analytical and quantitative-reasoning skills.

Department Admission Requirements

1. A minimum of 45 quarter credits completed, including ECON 200, ECON 201; STAT 311, STAT 341, or STAT 390; MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); and one 5-credit course in English composition.
2. A minimum cumulative GPA for all prior college work of 2.80;
3. GPA for five of the seven courses required for entrance must be at least 2.80 with a minimum grade of 2.0 for each course (highest math grade used in GPA calculation);
4. Transfer students must be enrolled at the UW before they may apply;
5. Application deadline is the second Friday of each quarter (including summer). All applicants who meet the minimum admission requirements are admitted in time to register as economics majors for the following quarter.

Major Requirements

65 credits as follows:

1. Admission to the major.
2. 15 credits in MATH 124, MATH 125, MATH 126 or equivalent.
3. A minimum of 50 credits in economics, including ECON 200, ECON 201; ECON 300, ECON 301; ECON 400 (or equivalent) or ECON 401; at least 10 additional credits chosen from the following courses: ECON 400 (or equivalent) or ECON 401, ECON 424, ECON 435, ECON 473, ECON 481 (or equivalent), ECON 482, ECON 483, ECON 485, ECON 486; at least 15 additional credits at the 400 level, excluding ECON 496, ECON 497, and ECON 499.
4. Grades of 2.0 or better in ECON 200, ECON 201, ECON 300, and ECON 301.
5. Transfer students are required to complete a minimum of 25 upper-division economics credits in residence at the UW.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* For undergraduates, the role of the Department of Economics is to train students in a rigorous, analytical discipline that advances their problem-solving abilities and their understanding of important public issues.

The Bachelor of Arts program provides the flexibility and social science training to prepare students for employment in a variety of areas. Also, it is excellent preparation for many masters-level graduate programs in other disciplines and for professional schools such as law, business and medicine.

The Bachelor of Science program is designed to provide undergraduates a rigorous background in economic analysis. This degree is designed for students who plan to do graduate study in economics or who plan to enter certain technically oriented professions, such as actuarial science, demography, financial analysis, or environmental consulting.

- * *Instructional and Research Facilities:* The department currently has a Resources Room (Savery 310), staffed during tutoring hours, which are posted in Savery 304 or at <http://depts.washington.edu/ecnboard/tutor.html>.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Internships, Research and Service Learning:* Course credit available for internships and research.
- * *Department Scholarships:* Scholarship opportunities are available for application during spring quarter. See departmental advisers for details. Note: Students must have filed a FAFSA with the University of Washington's Financial Aid Office to be eligible.
- * *Student Organizations/Associations:*
 - o Society for Economic Undergraduate Students (SEUS) promotes a cohesive economics community among students by organizing social outreach gatherings, community service, and internship and other opportunities. For more information, visit <http://students.washington.edu/seus>.
 - o The Economics Undergraduate Board (EUB) serves as a liaison between Economics students, faculty and alumni, and also provide services to the general Economics Undergraduate student body. The

EUB provides free tutoring for ECON 200, ECON 201, ECON 300, and ECON 301; holds career seminars and faculty lectures, and publishes the quarterly newsletter "The Economizer." For more information on these services, as well as others provided by the EUB, visit <http://depts.washington.edu/ecnboard/>.

Of Special Note:

- * Courses accepted in transfer as ECON 1XX or ECON 2XX cannot be applied to the major requirements unless courses equivalent to ECON 200 and ECON 201 were required as prerequisites. ECON X courses not having these prerequisites may be applied to electives for the degree, but not to the 50-credit economics-course requirement.
- * Internship and independent study ECON credits do not count towards the required ECON credits for the BA or BS degree.

Graduate Program

Graduate Program Coordinator
304A Savery, Box 353330
206-685-1384
econadv@u.washington.edu

The department offers programs of study leading to the Master of Arts and the Doctor of Philosophy degrees. The academic programs in economics are designed to develop trained economists for careers in teaching, private industry, government, and international agencies. Frequent seminars led by U.S. and foreign visitors as well as by faculty and students are conducted as an integral element of the department's graduate program.

Special Requirements

Applicants should have completed undergraduate training that includes courses in at least intermediate-level microeconomic and macroeconomic theory. In addition, applicants must have had at least one year of calculus, one term of linear algebra, and one term of statistics. A course in differential equations is strongly recommended. Additional work in calculus, matrix algebra, and probability and statistics is also strongly recommended. An undergraduate major in economics is not required for admission to the graduate program provided that the above prerequisites have been met. All applicants are required to take the General Test of the Graduate Record Examination (GRE).

Graduate requirements for the M.A. degree include ECON 500, 501, 502, 503, 508, 580, 581, and 582. In addition to this core program, M.A. students must take at least seven elective courses in economics at the graduate level. At least three of these courses must be in applied areas, and at least two must be in the same area (the field of specialization). M.A. students also must complete 6 credits of a supervised internship. Well-prepared students should be able to complete the M.A. program in two years.

Graduate requirements for the Ph.D. degree include ECON 500, 501, 502, 503, 508, 509, 580, 581, and 582. Ph.D. students are required to pass core examinations in microeconomics and macroeconomics. In addition to this core program, Ph.D. students must take eight other elective field courses in economics at the graduate level. Each Ph.D. student must satisfy the requirements for two fields of specialization. The fields of specialization include advanced macroeconomic theory, advanced microeconomic theory, comparative systems and development, econometrics, finance, health economics, industrial organization, international economics, labor economics, natural resource economics, and public finance.

The doctoral dissertation is the final major requirement for the Ph.D. degree. Each Ph.D. student chooses a dissertation topic and a doctoral supervisory committee is appointed. After the dissertation topic has been developed, Ph.D. students take the General Examination, an oral defense of the dissertation proposal. When the dissertation is completed, Ph.D. students take the Final Examination, an oral defense of the completed dissertation. A foreign language is not required. The doctoral program is designed to be completed in four years, although most students take slightly longer.

Financial Aid

The principal form of financial aid available to graduate students in economics is a teaching assistantship. A number of such assistantships are available to entering graduate students with promising academic records. Research and Computing Resources

The Institute for Economic Research houses a computer laboratory that provides hardware and software for economic modeling, economic estimation, word processing, and other faculty and graduate student research functions. Access is restricted to economics graduate students and faculty. In addition, the Center for Social Science Computation and Research (CSSCR) maintains an extensive library of computer software and data, and offers free consulting services to aid faculty and students with computing problems.

Course Descriptions

See page 336.

English

A101 Padelford

The Department of English offers courses in English, American, and related literatures. Courses in literature emphasize techniques of literary analysis; theoretical problems in the interpretation of texts; the social, historical, and political context of literary production and reception; and the pleasures of reading. Most require significant written work and stress critical thinking skills. Courses in language study examine the structural, historical, social, and aesthetic dimensions of English. The Creative Writing Program offers workshops in verse, short story, novel, and expository writing. English majors are exposed to many critical perspectives, and pursue interests in literary history, critical theory, language studies, and creative writing.

Undergraduate Education

Adviser
A2B Padelford, Box 354330
206-543-2634
engladv@u.washington.edu

The Department of English offers the following program of study:

- * The Bachelor of Arts degree with a major in English. A creative writing option is also available.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Foreign languages, classics, English history, American history, and philosophy.

Department Admission Requirements

1. Completion of 10 credits in any English literature courses. Completion of ENGL 202 and the attached writing link, ENGL 197, may also fulfill this requirement.
2. Minimum cumulative GPA of 2.00.
3. Minimum cumulative English GPA of 2.50.
4. Students apply to the English Advising Office, A2B Padelford, during the first two weeks of autumn, winter, and spring quarters. Transfer students must be enrolled at the UW before applying.
5. Admission is competitive. Completion of the above requirements does not guarantee admission.

Additional requirements for admission to the creative writing option:

1. Admission to the English major.
2. Completion of ENGL 283 and ENGL 284 or transfer equivalents.
3. Submission of an unofficial transcript and a writing sample of 3-5 poems and 5-10 pages of fiction (preferably a complete story).
4. Students interested in the creative writing option should apply to the Creative Writing Office, B-25 Padelford, during the first three weeks of autumn and spring quarters.
5. Admission is competitive. Completion of the above requirements does not guarantee admission.

Major Requirements

A minimum of 55 credits as follows:

1. ENGL 202 and writing link ENGL 197 (10 credits). It is recommended these courses be completed by the first quarter of admission to the major and no later than the second quarter after admission.

2. ENGL 302 (5 credits)
3. English core (25 credits): At least 5 credits from each of the following categories: (1) Theories and Methodologies of Language and Literature; (2) Forms and Genres of Language and Literature; (3) Histories of Language and Literature. A list of approved courses is available from the department advising office or department website: <http://depts.washington.edu/engl/>.
4. English electives (10 credits): Must be 200-level or above.
5. At least 15 credits must be in courses focused on pre-1900 literature.
6. Senior capstone course (5 credits) chosen from ENGL 407, ENGL 440, ENGL 442, ENGL 443, ENGL 444, ENGL 473, or ENGL 498.
7. A maximum of 20 credits of 200-level courses and a maximum of 5 credits of creative writing may be applied towards the major.
8. A minimum of 25 credits of English at the 200-level or above must be completed in residence at the UW.

The department strongly recommends, but does not require, 5 credits in one of the following English language courses: ENGL 370, ENGL 371, ENGL 373, ENGL 374, ENGL 478, ENGL 479, or LING 200.

Creative Writing Option

A minimum of 60 credits as follows:

1. ENGL 202 and writing link ENGL 297 (10 credits)
2. ENGL 283 and ENGL 284 (10 credits)
3. English core (20 credits) - At least 5 credits from each of the following categories: (1) Theories and Methodologies of Language and Literature; (2) Histories of Language and Literature. A list of approved courses is available from the department advising office or department website: <http://depts.washington.edu/engl/>.
4. At least 15 credits must be in courses focused on pre-1900 literature.
5. ENGL 383 and ENGL 384 (10 credits)
6. 10 credits of approved 400-level creative writing courses.
7. A maximum of 20 credits of 200-level courses may be applied towards the major.
8. A minimum of 25 credits of English at the 200-level or above must be completed in residence at the UW.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Good writing, analytical ability, research skills, and broadened perspectives are among the practical accomplishments majors acquire, all of which can be applied to a range of careers, including, but not limited to advertising, business and marketing, law, library science, the media, public administration, publishing, the social services, and teaching.

The undergraduate program of study in English concentrates on developing students' critical and interpretive abilities with regard to literatures written in English. Students become familiar with the critical developments in the study of language and literary forms, including especially understanding the cultural and historical contexts of various forms of literature. Students are, accordingly, asked to cultivate a habit of self-conscious and careful reading of written texts. Honing a successful habit of reading depends on acquiring an early awareness of the broad range of critical and interpretive methods available to readers of literature, as well as comprehending the basic purpose and effects at stake in different reading methods. Finally, students develop the ability to compose effective and persuasive written analyses of texts in a manner that demonstrates comprehension of the complexities or nuances of language, literature, and culture.

- * *Instructional and Research Facilities:* Computer labs in Mary Gates Hall for computer-integrated sections.

- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

- * *Research, Internships, and Service Learning:* The English Internship Program maintains an active list of over 200 local employers, including publishers, arts organizations, the media, advertising agencies, social service groups, schools, and businesses. Credit is available to declared English majors (ENGL 491).

- * *Department Scholarships:*

- o English Department scholarships are available to declared English majors enrolled at the UW for at least two quarters with a UW GPA of 3.50 and a UW English GPA of 3.70. Scholarship recipients must enroll for at least two quarters and carry at least 6 credits each quarter during the term of the scholarship. Applications, due in early

March, are available in A11 and A2B Padelford.

- o Additional scholarships and prizes in creative writing are open to UW English majors only. Applications, due in early March, are available in B25 and A2B Padelford.
- * *Student Organizations/Associations:* Bricolage is a student literary arts annual published entirely by UW undergraduates and features the works of University students, faculty, staff, and alumni. Students from all majors welcome. Contact: brico@u.washington.edu for details.

Of Special Note:

- * Students considering teaching English at the secondary level should consult an English adviser regarding coursework for the English Language Arts endorsement required for entry into the Secondary Teacher Education Program (TEP).
- * The Department of English offers study abroad opportunities in London and Rome. Students from all majors welcome. See department web site for more information.

Graduate Program

Graduate Program Coordinator
A105 Padelford, Box 354330
206-543-6077
englgrad@u.washington.edu

The Department of English offers a complete program of graduate courses and seminars designed to provide aspirants for the Master of Arts and Doctor of Philosophy degrees with a knowledge of English literature and language and the necessary scholarship for training in literary criticism and theory, literary history, and English-language study, including rhetoric and composition. It is possible to pursue a literature- or language-study emphasis. The Master of Fine Arts program in creative writing emphasizes projects in imaginative writing in fiction and poetry, supported by courses in criticism and literary periods and types. A special degree program, the Master of Arts for Teachers, is offered for English teachers in secondary schools and community colleges and a Master of Arts for Teachers (of English to speakers of other languages) for those interested in teaching English to speakers of other languages. The graduate program permits completion of master's degree requirements in four to six quarters and doctoral degree requirements in five years (including the master's degree). In a typical five-year Ph.D. program, a student is encouraged to complete course requirements (75 credits) during the first three years, the General Examination for the doctorate in the fourth year, and the dissertation in the fifth year. Those admitted with a master's degree from another university can complete the doctorate in four years: two years of course work, exam year, and dissertation year.

Financial Aid

The department annually awards 10 or more new teaching assistantships. To be considered for the following autumn, applicants must submit an assistantship application and supporting materials for admission to the graduate program by January 15. A statement of purpose, three recommendations, the GRE general test, and a critical-writing sample are required [except M.A.T. (E.S.O. L.)]. Teaching assistantship applicants who are not native speakers of English must submit as part of their application a score of 290 or better on the Test of Spoken English (TSE) or UW-administered SPEAK test.

Master of Arts

Admission Requirements

Bachelor of Arts degree: Major in English equivalent to that awarded by the UW preferred. Graduate Record Examination general test [GRE (literature in English) subject test recommended]. Three letters of recommendation, statement of purpose, and a critical writing sample.

Degree Requirements

Intermediate-level proficiency in a language other than English. 40 credits, including 30 credits in graduate English seminars. For students continuing to the doctoral program, a 10-credit master's essay. For a terminal master's degree, students may substitute 10 additional credits in graduate English seminars for the master's essay. A maximum of 5 credits may be transferred from an accredited graduate program elsewhere.

Master of Fine Arts

Admission Requirements

Bachelor of Arts degree, Graduate Record Examination general test, three letters of recommendation, statement of purpose, a critical-writing sample, and a creative-writing sample.

Degree Requirements

55 credits, including 20 credits in creative writing, 15 credits in graduate English seminars (5 credits must be from an approved course in criticism), 5 elective credits, 15 thesis credits (including a creative thesis, an MFA essay, and a final oral examination); demonstration of proficiency in a language other than English.

Master of Arts for Teachers

Admission Requirements

Same as for the Master of Arts degree, but usually including prior teaching experience.

Degree Requirements

45 credits, of which 25 must be in courses numbered 500 or above; including at least one course each in English language or linguistics, rhetoric and/or composition, literary criticism or critical theory, and literature; three courses must have a stated orientation on teaching English; and 5 credits of M.A.T. essay. In addition to the 45 credits, a student with no regular or formal teaching experience is required to complete at least 6 credits of ENGL 601 (Internship). 15 of these may be taken outside the department in courses related to the teaching of English, subject to approval.

Master of Arts for Teachers (of English to Speakers of Other Languages)

Admission Requirements

Bachelor of Arts degree, Graduate Record Examination general test, statement of purpose, three letters of recommendation. Students without training in linguistic method and theory must take LING 400 as a prerequisite for 400-level linguistics courses.

Degree Requirements

45-54 credits, including ENGL 571, 572, 574, 576; LING 446 or 450, ENGL 575 or LING 461; three courses from ENGL 471, 478, 479, 560, 561, 562, 563, 564, 567, 569, 575, LING 433/ANTH 464, LING 457/PSYCH 457, LING 451, 462; one elective course; 3-6 credits of ENGL 570. Intermediate-level proficiency in a language other than English.

Doctor of Philosophy

Admission Requirements

By petition to the Graduate Studies Committee upon completion of the M.A. degree option in literature. Students with recent master's degrees from other institutions are admitted at the post-master's level following the guidelines for admission to the M.A. option and must complete two quarters before petitioning the Graduate Studies Committee for admission to the doctoral program. Students transferring with a master's degree from other institutions may be required to submit an equivalent to the master's essay. Students with M.F.A., M.A.T., or M.A.T. (E.S.L.) degrees from this University must complete course-work and language requirements for the M.A. degree option and submit an equivalent to the master's essay.

Degree Requirements

75 graded credits of electives in graduate English seminars. Students with a recent master's degree from another university may count up to 30 credits from their master's program, upon approval of the Director of Graduate Studies. Students with a master's degree from the UW may count up to 40 credits in courses taken before admission to the doctoral program. Fluency in at least one language other than English, plus whatever additional language study the supervisory committee advises. Written examinations for literature emphasis: (1) historical period, (2) specialized field of study, (3)

second period, genre, or topic; written examinations for language emphasis: (1) major approach to English-language study, (2) second approach to language study, (3) textual focus (can be literary period); an oral General Examination; 27 credits of ENGL 800 (Dissertation) and a Final Examination based on the dissertation.

Course Descriptions

See page 340.

General Studies

171 Mary Gates Hall

General Studies is an interdisciplinary, individually designed major option for students who wish to create a program of study by combining selected courses from two or more departments. Students are required to identify a central organizing theme for their major and design it under the guidance and supervision of at least two faculty members and a General Studies adviser.

Undergraduate Program

Adviser
171 Mary Gates Hall, Box 352805
206-543-2550
genstudy@u.washington.edu

The General Studies program offers the following programs of study:

- * Bachelor of Arts
- * Bachelor of Science
- * Degree depends on the theme and curriculum of the approved major.
- * Ethnomusicology, technical writing, and public health are three faculty-designed major options also available through General Studies. Ethnomusicology (B.A.) focuses on the study of world cultures through their musical expression. Technical writing (B.A. or B.S.) offers the study of writing and other modes of communication in a variety of technical environments. Public health (B.A. or B.S.) involves the study of historical and contemporary issues in public health, including social and behavioral determinants of health, the geography of health and illness, the etiology of chronic and infectious diseases, the relationship between environmental factors and health, and access to health care and modes of delivery of health services.

Bachelor of Arts, Bachelor of Science

Suggested First- and Second-Year College Courses: Varies, depending on student's intended major.

Program Admission Requirements

Before developing a General Studies major, students should read *Designing a General Studies Major*, or obtain a copy from the Undergraduate Advising Center, 171 Mary Gates Hall. Particular attention should be paid to the sections defining restrictions on themes and restricted access to courses. General Studies majors are not possible in a number of subjects because the UW does not offer sufficient course work. Upper-division courses in departments with competitive admission are generally not available to students not in that major and ordinarily cannot be included in General Studies proposals.

After reading the guidelines, the student must go through the following steps to design a major:

1. Identify the unifying interdisciplinary theme of your program.
2. Make a list of courses you have taken or plan to take toward this goal. This list should comprise between 50 and 70 quarter credits, all of which are related to your area of concentration. These courses must come from at least two departments, but may come from any number of areas, so long as interrelationships are discernible. Most of the courses must be 300- and 400-level courses. At least half of the 50-70 credits selected for the major must come from courses taught within the College of Arts and Sciences.
3. Draft a statement that describes your proposed major and discusses the interrelationships among the courses you have chosen. Propose a brief, descriptive title for your major.

4. Submit your proposal to the General Studies Committee for initial approval. Prospective majors should submit proposals to the General Studies Committee for review at least three quarters prior to graduation.
5. Identify at least two faculty sponsors for the major. The faculty sponsors attest to the intellectual soundness of your proposal and agree to provide whatever guidance you may jointly decide you need. They may also suggest changes in your previously approved written proposal or list of courses.
6. Obtain final approval from a General Studies adviser.
7. Transfer students must be enrolled at the UW before applying to the major.
8. Admission requirements for the three faculty-designed major options vary. See an adviser for more details.

Major Requirements

55 to 70 credits, including completion of the approved curriculum and a 5-credit required senior study (minimum grade of 2.7 required for senior study). Awarding of the Bachelor of Arts or Bachelor of Science degree depends on the content of each student's program.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Varies, depending on student's theme.
- * *Instructional and Research Facilities:* None
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* None
- * *Department Scholarships:* None offered
- * *Student Organizations/Associations:* None

Geography

408A Smith

Geography is a far-reaching discipline providing a distinctive spatial approach to many of today's societal problems and issues: regional inequality; growth of service activities; residential and educational segregation; health-care delivery; urban growth management; transportation efficiency; environmental and pollution problems; economic impacts of major investments or technological changes; spatial efficiency of industrial production; spatial inequality in the distribution of goods, services, and resources; and the activities of international corporations and political states. Geography is the study of how individuals, groups, and societies interact with their environments. The discipline offers sufficient skills training to enable graduates to be competitive in many job markets.

Geography seeks to understand the complex processes that result in the patterns, trends and impacts of urbanization, migration, trade, and development. Geographers use interviews, written material, observation, and secondary data to construct models, maps, and other tools for understanding.

Undergraduate Program

Adviser
415B Smith, Box 353550
206-543-3246
geog@u.washington.edu

The Department of Geography offers the following programs of study:

- * Bachelor of Arts degree with a major in geography
- * A minor in geography

Individual undergraduate programs are built around five program concentrations. Students are encouraged to develop a specific, individualized focus of study within their chosen concentration.

1. *Urban, Social, and Political Processes and Patterns.* Human population distribution, migration, settlement systems, and organization. Geographic facets of ethnicity, race, sexuality, and gender; wealth and poverty; and health and disease. Cultural landscapes; politics, nationalism, and identity formation; geopolitics. Location of urban services, including health-care systems, urban transportation, housing, neighborhood development and land use, as well as issues raised by questions of law and social control. Urban spatial policies. Courses include: GEOG 230,

GEOG 277, GEOG 280, GEOG 308, GEOG 330, GEOG 342, GEOG 350, GEOG 371, GEOG 375, GEOG 377, GEOG 378, GEOG 380, GEOG 401, GEOG 430, GEOG 431, GEOG 432, GEOG 440, GEOG 442, GEOG 443, GEOG 445, GEOG 461, GEOG 474, GEOG 477, GEOG 478.

2. **Economic Geography.** Key questions in this concentration include the following: Why do some cities and regions grow while others decline? What local characteristics attract businesses and employment? What determines the flows of goods, services, ideas, people, and capital that bind together the world economy and the regions within it? How are all these relationships being affected by, and in turn influencing, technological change? What can governments and non-governmental organizations do to affect these characteristics and flows? What personal, organizational, and institutional attributes tend to influence spatial behaviors? What are the relevant economic analysis tools to apply to questions of environmental regulation and land use? What effects do global corporations have on the economies of regions and nation-states? To what extent is international development driven by questions of political economy? Courses include: GEOG 207, GEOG 208, GEOG 230, GEOG 302, GEOG 330, GEOG 336, GEOG 349, GEOG 366, GEOG 367, GEOG 370, GEOG 371, GEOG 430, GEOG 433, GEOG 435, GEOG 440, GEOG 443, GEOG 447, GEOG 448, GEOG 449, and GEOG 478.
3. **Regional Geography and International Development Studies.** Continental and global patterns of international relations and development. Political economy of development; development theory and practice; globalization. Analysis of geographic concepts in the regional context, especially on such topics as population growth and migration; development history, theory, and practice; hunger, resources, and poverty; and interconnections in the global economy. Special emphasis on East Asia, Russia and the former Soviet republics, Africa, Latin America, Canada, and the United States. Courses include: GEOG 230, GEOG 271, GEOG 302, GEOG 308, GEOG 330, GEOG 335, GEOG 336, GEOG 349, GEOG 371, GEOG 375, GEOG 404, GEOG 430, GEOG 431.
4. **Geographic Information Systems (GIS).** Role, design, and use of geographic information systems for research, planning, management, and decision making. Use of computers in the collection, manipulation, analysis, and presentation of geographical data. Courses include: GEOG 360, GEOG 370, GEOG 443, GEOG 458, GEOG 460, GEOG 461, GEOG 463, GEOG 465, GEOG 471.
5. **Society and Environment.** Examines the key debates on the causes and outcomes of environmental change and degradation and the paths to sustainable development; the use of data in the formulation of human-environment interaction models; perceptions of nature; nature-culture relationships; and historical and contemporary societal responses to environmental degradation, health problems, and resource consumption. Courses include: GEOG 270, GEOG 360, GEOG 370, GEOG 371, GEOG 372, GEOG 431, GEOG 432, GEOG 460, GEOG 461, GEOG 463, GEOG 471, GEOG 472, GEOG 480, GEOG 490.

Bachelor of Arts

Suggested First- and Second-Year College Courses: GEOG 100, GEOG 205, GEOG 207, GEOG 230, GEOG 277. Courses that develop strong writing, analytical, and qualitative- and quantitative-reasoning skills. Geography is inherently interdisciplinary, so exposure to many social science fields of study in the first two years is ideal.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

60 credits as follows:

1. **Foundations (40 credits)**
 - a. **Societies, Cities, & Economies (10 credits):** Eligible courses include GEOG 100, GEOG 123, GEOG 200, GEOG 207, GEOG 208, GEOG 230, GEOG 236, GEOG 245, GEOG 277, GEOG 280.
 - b. **Environment & Society (10 credits):** GEOG 205, plus one of the following: GEOG 270, GEOG 271, GEOG 370, GEOG 371, GEOG 372, or GEOG 380.
 - c. **Research Methods (20 credits):** GEOG 315, GEOG 326, GEOG 360, plus one additional methods course from the following: GEOG 425, GEOG 426, GEOG 440, GEOG 458, GEOG 460, GEOG 461, GEOG

465, GEOG 471, GEOG 480 Concentration (15 credits): Three upper-division GEOG courses, including two 400-level courses.

2. **Concentration (15 credits):** Students may choose from among five concentrations (GIS; economic geography; urban/social/political geography; development studies; society and environment), or customize their own hybrid focus along more thematic or issue-driven lines, such as migration studies, globalization, geography and health, sustainability, inequality, race/class/gender studies, etc. See advisers for details. Three upper-division (300- and 400-level) geography courses are required for this concentration, at least two of which must be at the 400 level.
3. **Electives (5 credits):** 5 credits of GEOG electives at the 200 level or above; 300- and 400-level courses preferred
4. **Additional Degree Conditions and Program Features**
 - a. Transfer students must complete a minimum of 25 upper-division credits (300 and 400 level) in Geography in residence at the University of Washington.
 - b. Individual geography course grades must be 2.0 or above to count toward major requirements; overall 2.50 GPA in geography courses counted toward the major required;
 - c. 5 credits of internship (GEOG 496) or independent study (GEOG 499) may apply toward the required 60 credits.

Minor

Minor Requirements: 30 credits in geography, including 15 upper-division geography credits with at least 5 credits at the 400 level. No more than 5 credits applied to the minor may be from 100-level classes. Independent learning and internship credits (GEOG 494, GEOG 496, GEOG 497, GEOG 499) may not be counted as part of the 30 credits. A minimum grade of 2.0 for each course counted toward the minor. At least 15 credits of upper-division geography courses must be taken at the UW.

Student Outcomes and Opportunities

* **Learning Objectives and Expected Outcomes:** The study of geography emphasizes both technical and critical thinking skills. Geographers' skill sets include the ability to use Geographic Information Systems (GIS) software to produce maps; advanced technical skills in statistical analysis; the ability to use census and other demographic data; sophistication in locating data and interpreting it to help make an argument; sophistication in visual techniques for displaying data, including maps, charts, and graphs; advanced use of such software as spreadsheets, relational data bases, and Web page design; and the ability to present multiple models of land-use patterns for analysis in environmental and economic decision making. Graduates have pursued careers as urban planners, environmental planners and land-use analysts, GIS analysts, economic analysts (marketing, location, geo-demographics), public health researchers, NGO specialists in developing nations, airline route analysts, import-export/international-trade specialists, real estate valuation specialists, economic development specialists, social studies teachers, and college professors.

* **Instructional and Research Facilities:** A map center in Suzzallo Library houses atlases, sheet maps, and aerial photographs. Departmental facilities include the Edward L. Ullman Geography Collaboratory and the John C. Sherman Laboratory, which houses a variety of computer workstations connected to the campus computer network. The Ullman Collaboratory in 415 Smith provides a unique collaborative classroom with networked computer work stations. The Geography Commons also provides computer work stations for students. The Department of Geography is a member of the Center for Social Science Computation and Research, which maintains an extensive data archive and offers many statistical and software consulting services.

* **Honors Options Available:** With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* **Research, Internships, and Service Learning:** More than 125 geography students participate each year in internships. For lists of these opportunities, see the department's career site.

* **Department Scholarships:** None offered.

* **Student Organizations/Associations:** The Undergraduate Geography Association (UGA) organizes field trips, alumni career panels, public-service projects, and social gatherings.

Of Special Note: Students planning to study economic, transportation, or urban geography are advised to take ECON 200, 201 as early as possible.

For those interested in international or area studies, foreign-language competence (i.e., at a level sufficient to be useful for elective, course-related reading and research) is highly desirable (Russian, Chinese, or Spanish). A working knowledge of a region's or nation's history, landscapes (including physical, urban, and cultural), and current role in world economics and politics will also be of great benefit. Students interested in GIS are encouraged to learn a high-level programming language such as C, C++, or Visual Basic.

Graduate Program

Graduate Program Coordinator
415B Smith, Box 353550
206-543-3246

The Department of Geography has flexible programs of graduate study leading to the Master of Arts and Doctor of Philosophy degrees. The aspirant to the master's degree is expected to complete all work for the degree in four to six quarters. The aspirant to the doctoral degree is expected to undertake two years of post-master's study and must take a departmental diagnostic examination upon entry, pass the General Examination, attain an appropriate level of competence in a foreign language or cognate field, and successfully complete a dissertation. Normally, doctoral program students complete all degree requirements in three to four years.

Master of Arts

Admission Requirements

Admission to the graduate program normally requires a minimum GPA of 3.00 (on a 4.00 scale), or "B." Students holding a master's degree must meet this minimum scholastic requirement, but also should have achieved a GPA higher than 3.00 for graduate studies completed. All applicants must take the Graduate Record Examination. Specific information regarding application procedures may be obtained by writing to the graduate program adviser.

Degree Requirements

45 credits, as follows:

- * GEOG 512 (5)
- * One of the following 400-level courses in analytical methods: GEOG 425 (5), GEOG 426 (5), GEOG 440 (5), GEOG 460 (5), GEOG 461 (5), or GEOG 471 (5).
- * At least three quarters of GEOG 598 (1, max. 3), the departmental colloquium, usually taken during the first year in the program
- * GEOG 597 (2). At the conclusion of GEOG 597, the student must write a revised statement of academic objectives.
- * The completion of at least two departmental research seminars numbered 500 and above, but not including GEOG 502, GEOG 512, GEOG 513, GEOG 515 or other nonspecialized seminars.
- * Remaining credits to be determined in consultation with adviser

Doctor of Philosophy

Admission Requirements

Admission to the graduate program normally requires a minimum GPA of 3.00 (on a 4.00 scale), or "B." Students holding a master's degree must meet this minimum scholastic requirement, but also should have achieved a GPA higher than 3.00 for graduate studies completed. All applicants must take the Graduate Record Examination. Specific information regarding application procedures may be obtained by writing to the graduate program adviser.

Degree Requirements

90 credits, as follows:

- * *Core requirements:*
 - o GEOG 515 (5). Post-master's students who have not previously completed a course on the history of geographic thought (GEOG 512) must complete such a course before taking GEOG 515.
 - o At least three quarters of GEOG 598 (1, max. 3), the departmental colloquium, usually taken during the first year in the program
 - o GEOG 597. At the conclusion of GEOG 597, the student must write a revised statement of academic objectives.

- o Two of the following 400-level courses in analytical methods: GEOG 425 (5), GEOG 426 (5), GEOG 440 (5), GEOG 460 (5), GEOG 461 (5), or GEOG 471 (5).
- o Entering post-master's students who have already completed one of these courses or their equivalents need complete only one additional analytical methods courses, subject to the approval of the Graduate Program Coordinator.
- o The completion of at least two departmental research seminars numbered 500 and above, but not including GEOG 502, GEOG 512, GEOG 513, GEOG 515 or other nonspecialized seminars. This requirement may be satisfied if the two seminars were taken while earning an MA degree in this program.
- o Submission of a scholarly article to a professionally-reviewed academic journal; or successful application for research support from external agencies such as the National Science Foundation, the Social Science Research Council, the Ford Foundation, the Fulbright Commission, etc. Additional writing credits may be earned by registering for GEOG 599. The publication may be jointly authored with a faculty member or other graduate student.
- * A minimum grade of 3.0 must be earned in all Geography courses, and a grade of 2.7 or higher must be obtained in all courses in related fields used to satisfy the doctoral degree credit requirement.
- * Evidence of reading competence in one foreign language, or a sound level of competence in one cognate field of concentration as determined by the student's Supervisory Committee.
- * A departmental written and oral Preliminary Examination, normally by the end of the third quarter in residence. Post-master's students seeking entry into the Ph.D. program must take the Departmental Preliminary Examination during their first year of enrollment. The Preliminary Examination, or designated parts, may be retaken once.
- * Successful completion of a Graduate School General Examination, normally held at the end of two years (six quarters) of study. The Supervisory Committee will examine the student's qualifications and competency to undertake dissertation research, and will evaluate the student's general training in geography and in the field of specialization. Normally, the oral examination will be preceded by a written examination.
- * Preparation and acceptance by the Dean of the Graduate School of a dissertation. The candidate is expected to register for a minimum of 27 credits of dissertation (GEOG 800) over a period of at least three quarters.

Financial Aid

The department usually awards approximately 15 to 20 teaching assistantships for the academic year. Most of the assistantships are for teaching quiz sections for a larger lecture class. A few of the more advanced doctoral candidates may teach a class. Normally, several research assistantships are also available. In recent years, approximately 85 percent of the department's graduate students have been funded by internal or external sources.

Course Descriptions

See page 345.

Germanics

340C Denny

The Department of Germanics focuses on the language, literature, and civilization of the German-speaking countries; on the role of their history, literature, and philosophy in Western civilization; and on linguistic analysis, especially historic, of the Germanic languages.

Undergraduate Program

Adviser
331 Denny, Box 353130
206-543-4580
uwgerman@u.washington.edu

The Department of Germanics offers the following programs of study:

- * The Bachelor of Arts degree with a major in Germanics with options in German language and literature, and German cultural studies
- * A minor in Germanics with options in cultural studies, language and literature, and linguistics.

Bachelor of Arts

Suggested First- and Second-Year College Courses: First- and second-year German or equivalent. Courses in Central European history, literature and culture, GERMAN 150 and 250 (conversational German through film). Courses on broad cultural topics offered by Germanics.

Department Admission Requirements

Admission to major status requires the completion of first- and second-year German or equivalent.

Major Requirements

German Language and Literature: 53 credits as follows:

- 15 credits to include: GERMAN 311, GERMAN 312, and either GERMAN 322 or GERMAN 323
- 15 credits from the following: GERMAN 411, GERMAN 412, GERMAN 421, GERMAN 422, GERMAN 423, or GERMAN 495
- One of the following (for 5 credits): GERMAN 333, GERMAN 334, GERMAN 401, or GERMAN 403
- 18 credits in any upper division Germanics courses not taken for requirements 1, 2, or 3, above. These may include no more than 4 credits from GERMAN 395 and GERMAN 396 combined, and no more than 5 credits each from GERMAN 446 and GERMAN 447. Up to two of the following lower division courses may also be counted toward this requirement: GERMAN 210, GERMAN 220, GERMAN 243, GERMAN 293, GERMAN 295.
- Specialization in Linguistics:* Students desiring this specialization must take GERMAN 451 and GERMAN 452 as part of the 18 elective credits shown in item 4, above, and may, with the adviser's permission, count relevant courses in linguistics outside Germanics as well.

German Cultural Studies: 50 credits as follows:

- 15 credits as follows: GERMAN 322, GERMAN 323, and either GERMAN 311 or GERMAN 312
- 15 credits from the following: GERMAN 411, GERMAN 412, GERMAN 421, GERMAN 422, GERMAN 423, or GERMAN 495
- 20 credits in any upper division Germanics courses not taken for requirements 1 and 2, above. These may include no more than 4 credits from GERMAN 395 and GERMAN 396 combined, and no more than 5 credits each from GERMAN 446 and GERMAN 447. Up to two of the following lower division courses may also be counted toward this requirement: GERMAN 210, GERMAN 220, GERMAN 243, GERMAN 293, and GERMAN 295. With the permission of the adviser, the student may also count toward this requirement courses relevant to German culture offered by other departments, such as history, political science, art history, music history, comparative literature, international studies, or comparative history of ideas.

For both options above, a grade of at least 2.0 must be earned in every upper-division German course; an overall GPA of 2.50 is required for all courses counted toward the major.

Minor

Minor Requirements:

Minimum 30 credits from one of the following three options:

- * *Language and Literature:*
 - 15 credits as follows: GERMAN 311, GERMAN 312; either GERMAN 322 or GERMAN 323
 - At least one upper-division language course beyond 302
 - 10 credits in upper-division Germanics which may include (a) no more than 4 credits total of GERMAN 395 and GERMAN 396; (b) no more than 5 credits of GERMAN 446; and (c) no more than 5 credits of GERMAN 447. Credits from any two of the following may be included: GERMAN 210, GERMAN 220, GERMAN 243, GERMAN 293, and GERMAN 295.
- * *Linguistics:*
 - 10 credits of GERMAN 451 and GERMAN 452
 - One 300- or 400-level language course (5 credits) beyond 302
 - One course from GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323
 - 10 upper division elective credits in Germanics or other departments offering linguistics.

- * *Cultural Studies:*
 - 15 credits of GERMAN 322, GERMAN 323; and either GERMAN 311 or GERMAN 312
 - 5 upper-division credits in Germanics offered in English
 - 3 credits in upper-division Germanics which may include (a) no more than 4 total credits of GERMAN 395 and GERMAN 396; (b) no more than 5 credits of GERMAN 446; and (c) no more than 5 credits of GERMAN 447. Credits from any two of the following may be included: GERMAN 210, GERMAN 220, GERMAN 243, GERMAN 293, and GERMAN 295.

A minimum grade of 2.0 is required for each course counted toward the minor.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The department's objective is the dissemination of the intellectual and artistic traditions of the German-speaking countries. Toward this goal the department offers courses conducted not only in German but also in English on aspects of German culture and history for general humanistic education.

The major in German language and literature offers training in verbal interpretation and analysis useful for any career that involves formulating and solving problems, especially for those with some special interest in Europe and Germany. It provides excellent preparation for students planning to do graduate work in German literature or linguistics, and also for those who wish to teach German in K-12 settings. Stress is placed on the critical analysis of texts, both in English and in German, and the development of high proficiency in language fluency, grammar, and style.

The major in German cultural studies also offers training in interpretation and analysis useful for any career that involves formulating and solving problems. It is designed for students who wish to study the German-speaking countries and their culture in the broadest context and encourages students to develop critical skills to analyze various aspects of culture and society, such as literature, film, art, architecture, and political and social institutions.

- * *Instructional and Research Facilities:* None

- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

- * *Research, Internships, and Service Learning:* Undergraduates may count 5 credits of internship (conducted either here or in a German-speaking country) toward their major or minor in German. Students must sign up in GERMAN 446. A list of internships is available on the departmental Web page. They include local businesses and training sites, as well as internship options abroad. The Office of International Programs and Exchanges offers a number of different study abroad options for Austria and Germany. Students can consult their Web site at depts.washington.edu/ipe. The Department of Germanics offers a "Spring in Vienna" program. Students can consult the departmental Web site for more information, or pick up a brochure in the main office.

- * *Department Scholarships:* The department's German Express program consists of a series of intensive courses able to take a student from no knowledge of German to fluency in one year. The best five students are awarded stipends of \$1,000 each to be applied toward study during spring quarter at a German university.

- * *Student Organizations/Associations:* German Club.

Of Special Note: Qualified students are invited to take part in the department's Spring in Vienna program. Every spring quarter the department sends a group of approximately 20 students to Vienna to participate in a program of studies in German language and Austrian culture for which students are able to earn 16 credits. Program costs are commensurate with in-state tuition at the University of Washington.

Graduate Program

Graduate Program Coordinator
345 Denny, Box 353130
206-543-6025
uwgerman@u.washington.edu

The graduate program in Germanics offers a broad, flexible, yet integrated curriculum that allows students to organize studies according to their

inclinations and professional needs. Although based upon objectives common to all aspects of study (such as the acquisition of a body of learning, training in technical skills, and development of critical judgment), the program offers a background for different professional pursuits: careers as scholars and teachers in literature, cultural studies, the humanities, linguistics and philology on the university level; the teaching of German language and civilization on the college and secondary school level; and professional writing, editing, and publishing. The master's curriculum requires a minimum of 40 credits, a critical M.A. paper, a textual analysis, and a final comprehensive examination. Study period of the doctoral program is two years (minimum number of post-master's course credits is 60). Completion of necessary coursework is followed by general written and oral examinations. A third doctoral year is reserved for writing the dissertation.

The M.A. and Ph.D. programs concentrate on German literature, civilization, cultural history, and philosophical traditions, with an option to include Germanic linguistics and courses outside the department.

Master of Arts

Admission Requirements

An undergraduate major in German, or equivalent. Superior German language skills.

Degree Requirements

- * 40 hours of coursework as determined in consultation with adviser
- * One critical M.A. paper
- * Text analysis in one of the M.A. areas of expertise (see below)
- * Written comprehensive examination in one of the M.A. areas

Areas of expertise for the MA in Germanics are literary history; intellectual history; cultural studies; and linguistics/philology.

Students must demonstrate foundational competency in three of the four areas of expertise. Evaluation of this expertise is based on three procedures: one comprehensive examination (based on the M.A. reading list); one text analysis (text selected by the M.A. committee from the M.A. reading list); one critical M.A. paper (based on work in a graduate seminar). Students choose the way these three evaluation procedures are distributed across their selected areas of expertise.

Doctor of Philosophy

Admission Requirements

Undergraduate major in German, or equivalent. Superior German language skills. Reading knowledge of a second foreign language (in addition to German) is required before the student is admitted to the Ph.D. General Examination. Languages chosen are subject to approval by the department. Degree Requirements
90 credits, as follows:

Candidates for the Ph.D. complete 60 credit hours at the 500 level or higher (GERMAN 411, GERMAN 451, GERMAN 452, GERMAN 497, GERMAN 498, GERMAN 499 may be counted toward this requirement if not already counted toward the M.A.); complete the foreign language requirement; submit two Ph.D. papers and a dissertation prospectus (or three Ph.D. papers); write three doctoral examinations; pass an oral examination; and complete a dissertation.

- * The 60 hours of coursework are selected at the student's discretion with an eye toward developing distinct areas of specialization, though students are encouraged to define their areas broadly.
- * Ph.D. papers: Students have the option of submitting either two doctoral papers and a dissertation prospectus (all to be submitted before the written examinations); or three doctoral papers with the prospectus submitted one quarter after the examinations. Any material submitted before the examinations must be in the candidate's file by the time the written examinations are scheduled. Doctoral papers should be in different areas. The first doctoral paper must be submitted by the beginning of the student's second doctoral year.
- * *Reading lists:* Guided by the Ph.D. reading list, students prepare their own reading lists for each of the three doctoral examination areas in consultation with the members of the Ph.D. supervisory committee.
- * Knowledge of a foreign language other than German, by completion of a literature course – with readings in the language and a grade of 3.0 or

higher – or by standard examinations in the target language approved by the Graduate Program Coordinator, must be demonstrated.

- * After students have completed the required 60 hours of coursework, met the language requirement, and had the dissertation prospectus approved they may register for 800-level coursework.
- * Students write three four-hour examinations organized in consultation with the supervisory committee according to one of the following patterns: one period exam, one genre exam, one special topic exam; two period exams, one genre exam; two period exams, one special topic exam; one period exam, two special topic exams (for students specializing in linguistics).

Financial Aid

A limited number of teaching assistantships and fellowships are available. The teaching load consists of a five-hour course on the first- or second-year level. The teaching assistants are supervised by experienced faculty members.

Course Descriptions

See page 350.

History

315 Smith

History undertakes the study of human affairs in a manner that seeks to understand change and development rather than the state of things at a given moment, taking into account societies in diverse parts of the world from the earliest times for which written records exist to the present.

Undergraduate Program

Adviser
318 Smith, Box 353560
206-543-5691
histadv@u.washington.edu

The Department of History offers the following programs of study:

- * The Bachelor of Arts degree with a major in history
- * The Bachelor of Arts degree with a major in the history and philosophy of science, offered jointly with the Department of Philosophy
- * Minors in history and history of science

Bachelor of Arts

Suggested First- and Second-Year College Courses: Courses that develop writing skills.

Department Admission Requirements

1. Minimum University GPA of 2.00.
2. Completion of 10 credits of college history with a minimum cumulative GPA of 2.50.
3. Completion of 10 credits of composition/writing courses with a minimum grade of 2.0 for each course. The requirement may be met by a freshman English composition course or a "W" course.
4. Students may apply to the major at any time in the quarter. Transfer students must be enrolled at the UW before applying.

Major Requirements

60 credits as follows:

1. At least one 5-credit "broad" course (as designated by the department) in each of the following fields: European, United States, and non-Western history (any area outside Europe, the United States, and Canada)
2. At least 10 credits in pre-modern history and 10 credits in modern history (as designated by the department)
3. At least 30 upper-division credits completed in residence at the UW
4. 5 credits of HIST 388, to be completed no later than within two quarters of declaring the major
5. 5 credits of undergraduate senior seminar (as designated by the department)

6. Beyond the required subjects, the student may or may not specialize, depending upon personal interests and career plans
7. A minimum GPA of 2.25 for all history courses and minimum grade of 2.0 in all history courses taken to fulfill requirements for the major.

Minor

Minor Requirements:

History: 30 credits of history, of which 20 must be upper-division, with a minimum grade of 2.0 in each course applied toward the minor. A minimum of 15 of the 20 upper-division credits must be completed in residence at the UW.

History of Science: 25 credits, including HIST 311, 312, 390, and 490; plus one course from HIST 215, 310, 313, 315, 316, 317, 318, 412, 498 (when topic is relevant), MHE 401, 422, 424. A minimum grade of 2.0 is required in each course.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The study of history enhances critical thinking and writing skills. It is a creative process in which students learn to use arguments and evidence to communicate a sound historical thesis. It is a liberal arts degree that encourages students to become well rounded, educated people. Graduates are prepared for a variety of careers in many professions and businesses. In addition to teaching, research, and museum and archives work, recent graduates have pursued careers as political lobbyists, journalists, and law enforcement officers. Many history majors pursue, and are well prepared for, further education and professional programs such as medicine, law, library science, and museum curatorship.
- * *Instructional and Research Facilities:* The department funds a writing center for students enrolled in history courses. The department also has a small computer lab available for history majors.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* The department encourages students to participate in internships that include historical elements. Students work with a sponsoring organization and a history faculty member. See adviser for details.
- * *Department Scholarships:*
 - o The Faye Wilson Scholarship is awarded to students emphasizing U.S. history and the Schwartz Fellowship to students pursuing historical study of a non-western civilization.
 - o History majors may compete for two paper prizes: The Thomas Power Prize for papers written in a history course of the last year, and the York/Mason Award for history papers written on African Americans in the West.
 - o In addition, the department allows students to nominate their high school history teacher for the Pressly Prize, which honors excellence in education.
 - o Scholarship and prize competitions run in February and March of each year. See adviser for details.
- * *Student Organizations/Associations:* Phi Alpha Theta, a history honors society. See adviser for details.

Graduate Program

Graduate Program Coordinator
206C Smith, Box 353560
206-543-8291
histgrad@u.washington.edu

The Department of History offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in a large number of fields within the discipline. Students in the programs prepare for careers as college teachers who combine teaching with scholarship and professional writing. A few graduates enter government service, college administration, or publishing. The M.A. program is normally completed in five or six full-time academic quarters or their equivalent.

Master of Arts

Admission Requirements

- * Completion of a strong undergraduate program in history, ordinarily as a history major.
- * Usually a minimum GPA of 3.50 (A-), particularly in history and related subjects, and especially in the final two years of work, and in graduate work if any graduate studies have been completed prior to application.
- * Ordinarily a score in the 80th percentile or higher on the verbal portion of the General Aptitude Test of the Graduate Record Examination (GRE).
- * Evidence of genuine intellectual ability and interest beyond the routine performance of academic tasks.
- * Reading knowledge of at least one language in addition to English is required for all graduate degrees. It is not a requirement for admission to the graduate program, but qualified applicants with knowledge of at least one foreign language may be favored over those who lack such knowledge. Moreover, and applicant who proposes to work for a degree in Greek, Roman, European, Russian, Medieval, Modern European, Latin American, Middle Eastern, or Asian history is expected to have begun to acquire a working knowledge in the foreign languages essential to research in the field.

Degree Requirements

In addition to Graduate School requirements, 36 credits minimum, as follows:

- * Submission of the Proposed Course of Study: Two Field MA form or Proposed Course of Study: Divisional MA form, as appropriate. This requirement must be met no later than the end of the second quarter of graduate study.
- * Official establishment of the MA Committee and submission of the Request for Establishing a Masters Supervisory Committee form. This requirement must be met no later than the end of the third quarter of graduate study.
- * Successful completion of all language requirements. This requirement must be satisfied no later than the quarter immediately preceding the quarter in which the student expects to complete the Master's degree.
- * Demonstrate by written examination mastery of a substantial body of historical knowledge. Students will be expected to construct their fields of study in consultation with their supervising faculty.
- * Satisfactory completion of a graduate seminar which entails the preparation of a research seminar paper; or the satisfactory completion of an M.A. thesis. Most seminars are two- or three-quarter classes.
- * Official submission of an application for the degree.

Doctor of Philosophy

Admission Requirements

- * Completion of a strong masters program in history, or a closely related field.
- * Usually a minimum GPA of 3.50 (A-), particularly in history and related subjects.
- * Ordinarily a score in the 80th percentile or higher on the verbal portion of the General Aptitude Test of the Graduate Record Examination (GRE).
- * Evidence of genuine intellectual ability and interest beyond the routine performance of academic tasks.
- * Reading knowledge of at least one language in addition to English is required for all graduate degrees. It is not a requirement for admission to the graduate program, but qualified applicants with knowledge of at least one foreign language may be favored over those who lack such knowledge. Moreover, and applicant who proposes to work for a degree in Greek, Roman, European, Russian, Medieval, Modern European, Latin American, Middle Eastern, or Asian history is expected to have begun to acquire a working knowledge in the foreign languages essential to research in the field.

Degree Requirements

In addition to Graduate School Requirements, 90 credits minimum, as follows:

- * Submission of the Proposed Course of Study form. This requirement should be met no later than the end of the second quarter after entrance to the PhD program. For students promoting into the PhD program from the MA program, this form must be completed no later than the end of the first quarter of doctoral study.
- * Official establishment of the Doctoral Supervisory Committee and

submission of the Request for Establishing a Doctoral Supervisory Committee form. This requirement must be met no later than the end of the third quarter after entrance to the PhD program. For students promoting into the PhD program from the MA program, this form must be completed no later than the end of the first quarter of doctoral study.

- * Language requirements must be satisfied no later than the quarter immediately preceding the quarter in which the student expects to the the Ph.D. General Examination.
- ** Satisfactory performance in the Ph.D. General Examination, which consists of four written examinations in four fields and an oral examination. Fields must be distributed among at least two divisions, such that at least one of these four fields lies clearly outside the student's primary division of concentration. Students will be expected to construct their fields of study in consultation with their supervising faculty. Ph.D. students concentrating in the U.S. history division will be required to offer at least one of the following three chronological fields: Early America, 19th Century, 20th Century. A grade of "honors" or "high pass" in a departmental field examination for the M.A. degree may exempt the student from the Ph.D. examination in that field at the discretion of the faculty member administering the Ph.D. examination.
- * Satisfactory completion of a seminar paper while enrolled as a Ph.D. student. This paper must be completed before the student takes the Ph.D. General Examination. Students who have not completed a graduate seminar in this department for their M.A. will ordinarily be expected to enroll in such a seminar as part of their course work for the Ph.D., and to write their research paper in the context of this seminar.
- * Official establishment of the Doctoral Reading Committee.
- * Preparation of an acceptable doctoral dissertation.
- * Satisfactory performance in a final oral examination in defense of the dissertation.

Financial Aid

Entering graduate students are considered for any departmental fellowships and other funding for which they are eligible. Students with, or who expect to receive, the M.A. degree by the time they begin their studies may apply for teaching assistantships and may, with continued satisfactory scholarly progress, hold a T.A. appointment for a total of nine quarters, provided adequate funds are available.

Course Descriptions

See page 353.

Honors

211 Mary Gates Hall

uwhonors@u.washington.edu

The honors program offers outstanding undergraduate students a special curriculum featuring small classes, challenging instruction, and close contact with faculty and other honors students. An emphasis on writing is incorporated into the honors core curriculum and honors seminars. Directed and independent study are particularly encouraged for upper-division students, commonly leading to a senior honors thesis or project. For a description of honors program requirements, see the Honors Web site.

Human Rights

The issue of human rights has attracted increased attention around the world. The tri-campus Human Rights minor at the University of Washington provides students the opportunity to learn about the political, philosophical, economic, cultural, and legal aspects of this complex subject.

Undergraduate Program

Adviser
42 Gowen, Box 353530
206-543-2396
lsjadv@u.washington.edu

111 Thomson, Box 353650
206-543-6001
jsisadv@u.washington.edu

The Human Rights minor is offered at all three University campuses, allowing students to take advantage of the expertise available on the campuses where they are not regularly in residence, although the minor can be completed on any one campus.

Minor

Minor Requirements: 25 credits, to include the following:

1. 10 credits from an approved list of courses* concerned with human rights as a core concept.
2. 5 credits from an approved list of courses* concerned with human rights in a broad context.
3. 10 additional credits drawn from the above approved lists of courses concerned with human rights.*
4. At least 3 credits of the required 25 credits must be in a human-rights-related internship, practicum, international study abroad, or demonstrated equivalent. Courses that satisfy this requirement include BIS 403, BIS 480; LSJ 310, LSJ 499, POL S 496, SIS 399, and similar practicum and study-abroad courses in other programs (on the Seattle campus); and TIAS 496. See adviser for faculty-approved alternatives. Courses used to satisfy this requirement must be approved/supervised by the faculty offering courses appropriate to the minor. Credits for the minor may be completed across the three UW campuses, or on any single campus. If the minor is completed by a Seattle-major student, no more than 10 credits applied to the minor may be in the student's major department.

*The list of core courses and context courses is maintained by the Human Rights Advisory Committee. For the current list of such courses, see depts.washington.edu/hrights/hrminor.html. Note: From time to time, the Advisory Committee adds, subtracts, or reclassifies courses on the approved list. Students who have planned their studies on the basis of an earlier list may fulfill the requirements of the minor as specified in that earlier list.

Humanities (Evening Degree)

103 Lewis Hall

This multidisciplinary major includes upper-division humanities courses selected by faculty of the College of Arts and Sciences. Students explore diverse perspectives in thematically related courses from classics, literature, intellectual history, comparative religion, communications, and art history. Focus is on the ways human beings from different cultures understand their world through communication, literature, and the arts. Students discuss literary and artistic works from a variety of perspectives and approaches, as well as theories of interpretation and practical communication. Analytical, research, and communication skills which can enhance a person's career opportunities are emphasized. Coursework encourages greater understanding of issues, ideas, and themes in history and the contemporary world.

Undergraduate Program

Adviser
103 Lewis Hall, Box 353921
206-543-6160
advisers@extn.washington.edu

Humanities offers the following program of study:

- * The Bachelor of Arts degree with a major in humanities

Bachelor of Arts

Suggested First- and Second- Year College Courses: English composition and additional writing. Introductory courses in Visual, Literary, & Performing Arts (VLPA) and Individuals & Societies (I&S). First-year foreign language study.

Program Admission Requirements

1. Admission to the Evening Degree program (separate from admission to the UW day program).
2. Minimum 75 college quarter credits completed. Most students admitted have completed two years of lower-division college work.
3. See adviser for evaluation of applicable courses and credits.

Major Requirements

60 credits from the approved list of humanities courses, as follows:

1. Not more than 15 credits in 200-level courses (some or all of which may have been completed prior to admission to the major).
2. At least 45 credits of 300- and 400-level courses, of which a minimum 15 credits must be at the 400 level.
3. Minimum 2.25 GPA for all courses counted toward the major.
4. For list of applicable courses, consult the adviser or go to www.evedegree.washington.edu/edp/majors/humanities_courses.asp.

Additional Degree Requirements

1. English composition and additional writing (15 credits)
2. Quantitative and Symbolic Reasoning (Q/SR) (4-5 credits)
3. Foreign language – through the third quarter of a single foreign language (0 to 15 credits, depending on placement)
4. Areas of Knowledge
 - a. Visual, Literary, & Performing Arts (VLP) (20 credits)
 - b. Individuals & Societies (I&S) (20 credits)
 - c. Natural World (NW) (20 credits)
 - d. Some credits in VLP and/or I&S may count also toward the major
5. Additional work to complete a minimum 180 credits overall.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Students gain knowledge about the social, historical, ethical, and aesthetic significance of the visual, literary, and philosophical influences that constitute our present environment and heritage of many cultures. They become familiar with critical developments in the study of literary forms, especially the understanding of cultural and historical contexts. Students develop the ability to compose effective and persuasive written analyses of texts in a manner that demonstrates comprehension of the complexities and nuances of language, literature, and culture. Majors gain an appreciation for the complexity of human communication. They then are able to demonstrate an understanding of various written and spoken communication forms, processes, and perspectives within a cultural context.

Specific skills acquired include writing, critical thinking, research, analytical thinking, integrative cognitive abilities, and effective public speaking.

Humanities majors pursue widely varied careers, including education, editing, private enterprise, public administration, creative writing, management, arts administration, museology, and events planning.

- * *Instructional and Research Facilities:* Students use all university library resources and facilities corresponding with their individual research needs. In addition, each of the contributing humanities academic departments offers individual resources to majors. Check with advisers for options.
- * *Honors Options Available:* None offered.
- * *Research, Internships, and Service Learning:* The program works collaboratively with students interested in pursuing independent study and research opportunities through academic departments that contribute to the major. Opportunities for work with the Carlson Center, Office of International Exchanges, and service learning are possible for all students.
- * *Department Scholarships:* The Evening Degree program awards need-based financial aid assistance each year to students from a general fund. Two additional scholarship resources are the Rodney I. Straub Endowed Scholarship and the Nicole Snyder Dettmar Endowed Scholarship.
- * *Student Organizations/Associations:* None at present.

International Studies

401 Thomson

The Henry M. Jackson School of International Studies organizes and supports interdisciplinary teaching and research in international affairs. The school consists of a group of interdisciplinary area-studies programs on major world regions, as well as topical and comparative programs of study that transcend national and regional boundaries.

Undergraduate Program

Adviser
111 Thomson, Box 353650
206-543-6001
jsisadv@u.washington.edu

The School of International Studies offers the following programs of study:

- * The Bachelor of Arts degree with a major in international studies with options in Asian studies, Canadian studies, comparative religion, European studies, international studies, Jewish studies, and Latin American studies
- * Minors in African studies, Canadian studies, China studies, comparative Islamic studies, comparative religion, European studies, international forestry, international studies, Japan studies, Jewish studies, Korea studies, Latin America studies, South Asian studies, and Southeast Asian studies.

African Studies

Lynn M. Thomas, Chair
Adviser
302D Thomson, Box 353650
206-616-0998
africa1@u.washington.edu

African Studies involves a cross-campus, interdisciplinary group of faculty, staff, and students who share an interest in interdisciplinary questions relating to Africa and the African diaspora. Africa-focused courses are taught in a variety of scholarly disciplines and programs, including art, music, anthropology, forestry and fisheries, geography, history, international health, and American ethnic studies. The Program on Africa coordinates and disseminates information on African Studies activities; administers a minor for undergraduates; and facilitates research, internships, and study abroad opportunities.

Minor

Minor Requirements:

1. 30 credits chosen from at least three departments whose courses are listed below, including at least 10 credits at the 100, 200, or 300 level and at least 20 credits at the 400 level.
2. Students are encouraged to study relevant languages such as Arabic, Swahili, Portuguese, or French.
3. Courses may be chosen from the following: AFRAM 150, AFRAM 201, AFRAM 306 through AFRAM 309, AFRAM 401, AFRAM 402, AFRAM 403; ANTH 313, ANTH 318, ANTH 401, ANTH 402, ANTH 423, ANTH 471, ARCHY 303, ARCHY 312, ARCHY 401, BIO A 388, BIO A 389; ARAB 401, ARAB 411 through ARAB 416, ARAB 421, ARAB 422, ARAB 423; ARCH 251; ART H 205, ART H 230, ART H 330, ART H 337, ART H 350, ART H 436, ART H 437, ART H 438; GEOG 230, GEOG 371, GEOG/SIS 335; HIST 151, HIST 152, HIST 260, HIST 425, HIST 451, HIST 452; MUSIC 317, MUSIC 319; NEAR E/SISME 210; POL S 331, POL S 449; SIS 456/POL S 450, SISAF 444, SISAF 499; SOC/AES 462; WOMEN/SIS/ANTH 345.
4. Minimum grade of 2.0 in each course applied toward the minor.

Asian Studies

The undergraduate program in Asian Studies is directed by a committee consisting of the chairs of China Studies, Korea Studies, Japan Studies, South Asian Studies, and Southeast Asian Studies (see below under Minors), and a designated faculty coordinator.

The Asian Studies major combines language training with interdisciplinary study of an Asian region or single country. The program emphasizes social science approaches to the study of history, culture, and society, with provision for study of literature and the arts as well. Students may focus on China, Japan, Korea, South Asia (Bangladesh, India, Nepal, Pakistan, Sri Lanka, Tibet), Southeast Asia (Brunei, Burma (Myanmar), Cambodia, East Timor, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, Vietnam), or Asia as a whole. Five interdisciplinary minors on individual countries or regions also are offered.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Either SISA 209 or 210, and two introductory Asian civilization course (see major requirements,

below). Progress toward two years of a relevant Asian language. Courses that develop writing skills, especially in the social sciences.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

30 credits or second-year equivalent language training in a language appropriate to student's concentration, plus 50 credits as follows:

1. Either SISA 209 or SISA 210 (5 credits)
2. SIS 201 (5 credits)
3. An Asian civilization course in student's concentration chosen from SISEA/HSTAS 212, SISEA/HSTAS 241, HSTAS 201, HSTAS 202, HSTAS 211, SISSA 200, SISSE/HSTAS 221 (5 credits)
4. 35 credits of approved coursework from one regional or country concentration, or from the general Asia concentration
5. Approved research paper required in one of the upper division concentration courses
6. Minimum grade of 2.0 in all courses counted toward the major (except first- and second-year language courses, where grades must average 2.00)
7. 30 of the 35 credits required for the concentration requirement must be taken in residence at the UW.

Minor

Minor Requirements:

The following are the approved Asian civilization courses for the minors: SISA 209, SISA 210; SISEA/HSTAS 212 (Korea); SISEA/HSTAS 241 (Japan); SISSE/HSTAS 221 (Southeast Asia); HSTAS 201 (India), HSTAS 202 (India); HSTAS 211 (China).

China Studies

R. Kent Guy, Chair

Minor Requirements: 30 credits, to include the following:

1. HSTAS 211 and either RELIG 202 or one additional Asian civilization course from approved list above (10 credits)
2. 15 credits of electives taken at the UW, chosen from SISEA 370, SISEA 444, SISEA 445, SISEA 449, SISEA 454, SISEA 468 (or their joint-listed equivalents), ECON 466, GEOG 336, GEOG 435, HSTAS 453, HSTAS 457/WOMEN 457, HSTAS 459/WOMEN 459
3. A maximum of 5 credits chosen from CHIN 373, CHIN 374, CHIN 380, CHIN 381, ART H 311, ART H 410 through ART H 418, ART H 430 also may be included
4. 5 additional credits chosen from the elective list above, or in Chinese language beyond second-year level, or in upper-division transfer courses on China
5. Minimum grade of 2.0 required in each course applied toward the minor.

Japan Studies

Marie C. Anchordoguy, Chair

Minor Requirements: 30 credits, to include the following:

1. SISEA/HSTAS 241 and one additional Asian civilization course from approved list above (10 credits)
2. 15 credits of electives taken at the UW, chosen from SISEA 242, SISEA 422, SISEA 423, SISEA 435, SISEA 440, SISEA 441, SISEA 442, SISEA 447, SISEA 474, SISEA 475, SISEA 482, SISEA 486, SISEA 487, SISEA 494 (or their joint-listed equivalents). (A maximum of 5 credits chosen from JAPAN 321, JAPAN 322, JAPAN 323, ART H 204, ART H 321, ART H 420 through ART H 427, ART H 429 also may be included in the 15 credits.)
3. 5 additional credits in Japanese language beyond second-year level, or in upper-division transfer courses on Japan, or in additional electives chosen from electives listed above.
4. Minimum grade of 2.0 required in each course applied toward the minor

Korea Studies

Clark W. Sorensen, Chair

Minor Requirements: 30 credits, to include the following:

1. SISEA/HSTAS 212 and one additional Asian civilization course from approved list above (10 credits)
2. 15 credits of electives taken at the UW, chosen from SISEA/ANTH 448, HSTAS 481, HSTAS 482, SIS/ANTH 449
3. A maximum of 5 credits chosen from other upper-division SISEA-prefix courses on China, Japan, or East Asia also may be included
4. 5 additional credits in Korean language beyond second-year level, or in upper-division transfer courses on Korea, or in additional electives chosen from list above.
5. Minimum grade of 2.0 required in each course applied toward the minor

South Asian Studies

K. Sivaramakrishnan, Chair

Minor Requirements: 30 credits, to include the following:

1. HSTAS 202 or SISSA 200 and one additional Asian civilization course from approved list above (10 credits)
2. 15 credits of electives taken at the UW, chosen from the following: any SISSA-prefix course or its joint-listed equivalent; ANTH 437, ANTH 471; ANTH/ENVIR 371, ANTH/ENVIR 451; ANTH/RELIG 321, ANTH 352/RELIG 350; ART H 204, ASIAN 203, ASIAN 206, ASIA 263, ASIAN 411; HSTAS 401 through HSTAS 404, HSTAS 431; HUM 101; MUSIC 316, MUSIC 428, MUSIC 447; PHIL 412, PHIL 418; RELIG 202, RELIG 352, RELIG 354, RELIG 452; SIS/POL S 337, SIS/POL S 436; WOMEN/SIS 333, WOMEN/SIS 345
3. 5 additional credits in a South Asian language beyond second-year level, or in upper-division transfer courses on South Asia, or in additional electives chosen from list above.
4. Minimum grade of 2.0 required in each course applied toward the minor.

Southeast Asian Studies

Marjorie A. Muecke, Chair

Minor Requirements: 30 credits, to include the following:

1. SISSE/HSTAS 221 and one additional Asian civilization course from approved list above (10 credits)
2. 15 credits of electives taken at the UW, chosen from any SISSE-prefix course or its joint-listed equivalent, ANTH 357, 471, ANTH/NURS 492, ART H 204, HSTAS 462, HSTAS 463, HIST 335, RELIG 202, RELIG 354, RELIG 350/ANTH 352, MUSIC 316, MUSIC 439
3. 5 additional credits in a Southeast Asian language beyond second-year level, or in upper-division transfer courses on Southeast Asia, or in additional electives chosen from list above.
4. Minimum grade of 2.0 required in each course applied toward the minor.

Canadian Studies

Kim England, Chair

Canadian Studies offers a program that provides a broad understanding of Canadian society, culture and communications, historical development, and contemporary problems.

Bachelor of Arts

Suggested First- and Second-Year College Courses: ECON 200, ECON 201. Progress toward two years of French language. Canadian history courses. Courses that develop writing skills.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

30 credits or second-year-equivalent French language training, plus 53 credits as follows:

1. SIS 200, SIS 201, SIS 202; ECON 200, ECON 201; SISC A 356, SISC A 498
2. Minimum 18 credits from approved Canadian Studies elective course list.

Minor

Minor Requirements: 25 credits as follows:

1. SISC A 356 and SISC A 498 (10 credits)
2. 15 credits of electives. Recommended electives: SISC A 308, SISC A 341, SISC A 377, SISC A 424, SISC A 430, SISC A 441, or joint-listed equivalents. Other approved electives: AAS 372, ANTH 310, COM 420/ SIS 419/POL S 468, ENGL 359/AIS 377
3. Minimum grade of 2.0 required in each course applied to the minor
4. Minimum of 15 credits to be completed at the UW

Comparative Islamic Studies

Comparative Islamic Studies offers a program that provides a broad understanding of Islamic society, culture and communications, historical development, and contemporary problems.

Minor

Minor Requirements: 30 credits as follows:

1. NEAR E/SISME 210 (5)
2. NEAR E/RELIG 211 or NEAR E/RELIG 212 (5)
3. 10 credits in Islamic religious traditions and texts, chosen from NEAR E 402, NEAR E 423, NEAR E 442, NEAR E/RELIG 430, NEAR E/RELIG 432, NEAR E/RELIG 433, ARAB 451 through ARAB 456, ARAB 459, ARAB 460, ARAB 462, ARAB 470, PRSAN 452 through PRSAN 456, TKIC 454 through TKIC 456, TKISH 451, TKISH 452
4. 10 credits in history, society and culture of Islam, chosen from ANTH/ SISSE 314, ANTH 318, ANTH 401, HIST 161, HIST 260, HIST 370, HIST 461, HIST 462, HIST 463, HSTAS/SISSE 221, HSTAS 402, HSTAS 403, HSTAS 462, HSTAS 463, HSTEU 453, MUSIC 316, MUSIC 439, MUSIC 444, NEAR E 242, NEAR E 250, NEAR E 440, POL S 331, POL S 431, POL S 433, POL S/SISSA 340, POL S/SISSA 434, POL S/SISSE 343, SIS 406/POL S 432, SISME 430, SISME/NEAR E 495, SIS 377/NEAR E 375, SISRE/NEAR E 450, SISRE 410
5. Minimum grade of 2.0 required in each course counted toward the minor.

Comparative Religion

Martin S. Jaffee, Chair

The Comparative Religion major introduces students to broad theoretical issues in the academic study of religion, and encourages them to explore these issues through mastering details of the textual canons, historical traditions, social contexts, and cultural forms of religion.

Bachelor of Arts

Suggested First- and Second-Year College Courses: RELIG 201, RELIG 202. Courses that develop writing proficiency. Courses in particular religious traditions such as Christianity, Judaism, Islam, Hinduism, and Buddhism. Courses in the history of civilizations such as Chinese, South Asian, and Western.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

55 credits as follows:

1. RELIG 201, RELIG 202; RELIG/CHID 380; SIS 201
2. 35 additional credits in RELIG or non-RELIG prefix courses, of which at least 15 must be at the 300 level or above, selected from the three rubrics of textual canons, historical traditions, and social contexts and cultural forms. The distribution must include at least 5 credits and no more than 20 credits in any particular rubric.

Minor

Minor Requirements: 30 credits as follows:

1. RELIG 201, RELIG 202
2. 15 additional credits in RELIG-prefix courses or joint-listed equivalents
3. 5 additional credits chosen from RELIG courses or from ANTH/SISSE 315, ANTH 447/SISSE 445, ANTH 321, ANTH 421, HIST/SISJE 250, HIST 209, HIST 310, HSTAS 201, HSTAS 211, HSTAS/SISEA 212, NEAR E/SISME 210, PHIL 267, SISEA/HSTAS 241, SOC 457.

European Studies

Carol G. Thomas, Chair

The curriculum in European Studies prepares students to pursue careers requiring an understanding of all the forces, both material and cultural, contemporary and historical, that are shaping Europe today (north, south, east, and west), taking into account transitions involved in the post-Soviet era and the movement toward greater political, economic, and cultural integration among the various nations involved. Students also may concentrate, within the major, on Hellenic studies, European Union studies, or Russian, East European, and Central Asian studies.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Progress toward two years of a modern European language. A survey course on modern Europe.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

60 credits as follows:

1. 10 credits of a foreign language at the third-year level or beyond
2. 15 credits of core courses, including EURO 301 (5 credits), SIS 201 (5), and a survey course on modern Europe (5)
3. One quarter (10 credits minimum) of foreign study
4. 15 credits from approved list of electives
5. EURO 494-EURO 495, Senior Research Seminar (10 credits)
6. See adviser for specific course options.

Minor

Minor Requirements: 25 credits as follows:

1. Foreign language through the sixth quarter
2. 15 credits of core courses including EURO 301 (5 credits), SIS 201 (5), and a survey course on modern Europe (5)
3. 10 credits from approved list of electives.

International Studies

Mary P. Callahan, Chair

The general program in International Studies gives students a comprehensive and interdisciplinary perspective on world problems and an ability to analyze the subtle interactions of politics, economics, and culture within the global system.

Bachelor of Arts

Suggested First- and Second-Year College Courses: 30 credits of a single foreign language. ECON 200, ECON 201.

Department Admission Requirements

1. Admission is competitive, based on overall GPA, grades in the social sciences, a written statement of goals, language background, and any international experience. Before applying, students must complete either ECON 200 or 201, and either SIS 200 or 201. Grades in these courses will be given special consideration.
2. Application deadline is the third Friday of each quarter; students are notified by the sixth Friday of the quarter in which they apply. Transfer students must be enrolled at the UW before applying to the major.

Major Requirements

Foreign-language competency through the second-year college level, plus 70 credits as follows:

1. ECON 200, ECON 201; SIS 200, SIS 201, SIS 202, SIS 401, SIS 495, SIS 498
2. Three or four upper-division courses in an approved option
3. Three upper-division interdisciplinary courses in international studies from an approved core list
4. A research paper of approximately 25 pages to be completed in one of the courses in the student's approved option or in one of the approved interdisciplinary courses
5. Majors are required to maintain a GPA of at least 2.50, both overall and in the program, and to earn a minimum grade of 2.0 in all required SIS-prefixed courses.

Minor

Minor Requirements:

International Studies: 30 credits as follows:

1. 10 credits chosen from SIS 200, SIS 201, SIS 202
2. 15 credits in SIS-prefix courses numbered 200 or above (courses with other JSIS prefixes are not eligible). These 15 credits must include at least 5 credits at 400 level (SIS 401 is recommended).
3. 5 additional credits chosen from SIS-prefix courses or from undergraduate courses having any of the following prefixes: SISA, SISAF, SISCA, SISEA, SISJE, SISLA, SISME, SISRE, SISSA, SISSE, EURO, RELIG
4. Minimum grade of 2.0 is required in each course applied toward the minor.

International Forestry: 30 credits as follows:

- * Core courses (18 credits) -- I BUS 300 or SIS 330; GEOG/SIS 335, F M 423, and F M 492
- * Upper-division electives (12 credits) --
 - o For students majoring in forest management, wildland conservation, forest engineering, wildlife sciences, or environmental horticulture and urban forestry: SIS 401, 430, GEOG/SIS 375, GEOG/SISA 372, and GEOG/SISCA 308, or any I BUS, SIS, SISEA, SISLA, SISRE, SISSA, or SISSE course.
 - o For students majoring in other programs: ESC 322, ESC 410, F E 368, F M 320, F M 360, F M 371, F M 470, or any F M, ESC, or F E course. See faculty adviser for other options.
- * Minimum grade of 2.0 required in each course.

Jewish Studies

Paul Burstein, Chair

Jewish Studies takes an interdisciplinary approach to the global study of Jews, exploring the rich diversity of their cultures, their philosophies, their religious practices, their histories, their roles in politics, and other areas of contemporary life.

Areas of concentration include ancient cultures and sacred texts, modern literature and culture, Jewish languages, American Jewish studies, Sephardic studies, European Jewish studies, and Israel and Middle East studies.

Bachelor of Arts

Suggested First- and Second-Year College Courses: RELIG 210, SISJE/HIST 250. Courses that develop writing skills. Courses in international studies and world history -- ancient, medieval, and modern. Modern European languages, e.g., French, German, Italian, Spanish. Progress toward two years of Hebrew.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

52 credits as follows:

1. *Introductory courses (15 credits):* RELIG 210, SISJE/HIST 250, SIS 201
2. *Jewish Studies Track (20 credits):* Approved courses in either The Judaic Cultural Tradition or The Jewish People in the Modern World

3. *Jewish Languages and Texts (15 credits).* A minimum of 15 credits selected from an approved list of courses. Students must be proficient in the Hebrew language through second year level. Students in the Cultural Tradition track may study ancient or modern Hebrew. Modern Hebrew is required for students in the Modern World track. Under certain circumstances substitution of coursework in an appropriate Jewish lingua franca other than Hebrew may be approved by petition.
4. *Senior paper or project (2 credits):* SIS 494

The lists of Jewish Studies courses are maintained by the Jewish Studies Program as part of its Web site. For the current list of such courses, see <http://jsis.artsci.washington.edu/advise/catalog/Jewish-b.html>

Minor

Minor Requirements: 30 credits as follows:

1. RELIG 210 (5 credits), SISJE/HIST 250 (5)
2. 20 additional credits chosen from any upper-division SISJE-prefix courses (except 499) or their joint-listed equivalents, or from ENGL 311, ENGL 312, GERMAN 295, HEBR-prefix courses numbered 451 or higher, HEBR/ARAB 470, HEBR/ARAB 472, NEAR E 251, NEAR E 325, NEAR E/RELIG 240, RELIG 400, RELIG 410, RELIG 415, RELIG 460, RELIG 491. One course chosen from HEBR 413, HEBR 421, HEBR 422, HEBR 423, HEBR 426, HEBR 427, HEBR 428 may also be included.
3. 15 credits of the minor must be taken in residence at the UW.

Latin American Studies

Jonathan Warren, Chair

The Latin American Studies major combines language study in Spanish and Portuguese with work in history, the humanities, and the social sciences. It provides a comprehensive, interdisciplinary understanding of this major world region, emphasizing themes such as economic development, popular movements, cultural analysis, and hemispheric relations. At the same time, it gives students the option to develop their own particular disciplinary and thematic interests.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Substantial progress toward completing two years of Spanish and one year of Portuguese, or two years of Portuguese and one year of Spanish. Courses in any of the following disciplines that deal with Latin America: history, literature, economics, geography, sociology, political science.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

52 credits plus language training, as follows:

1. Training in two foreign languages of Latin America, to include the sixth quarter (or equivalent) of one language chosen from Spanish, Portuguese, or French, and the third quarter (or equivalent) of a second of these languages.
2. SIS 201 (5 credits)
3. *Latin American History (10 credits):* Courses to be selected from an approved list.
4. *Contemporary Latin America (15 credits):* Courses drawn from a range of disciplines including anthropology, comparative literature, geography, international studies, and Spanish. See program Web site for a complete list of courses.
5. *Electives (15 credits):* Courses on Latin America and international studies selected from an approved list.
6. *Interdisciplinary seminar (5 credits):* SISLA 485, SISLA 486, SISLA 492, or another course chosen from an approved list of research seminars.
7. *Senior paper or project (2 credits):* SIS 494

Lists of Latin American Studies courses are maintained by the Latin American Studies Program as part of its Web site. For the current list of such courses, see <http://jsis.artsci.washington.edu/advise/catalog/Latam-ba.html>

Minor

Minor Requirements: 30 credits as follows, plus foreign language:

1. One year of Spanish or Portuguese, or equivalent proficiency
2. At least 5 credits chosen from HSTAA 185, HSTAA 381, HSTAA 382, HSTAA 383, and HSTAA 384
3. At least 5 credits chosen from CHSTU 101, CHSTU 200, CHSTU 330, HSTAA 285, MUSIC 433, PORT 310, PORT 335, SISLA/SPAN 485, SISLA/SPAN 486, SISLA/SPAN 489, SPAN 307, SPAN 320, SPAN 321, SPAN 322, SPAN 332, SPAN 339, SPAN 376, SPAN 439, SPAN 473, SPAN 474, SPAN 475, SPAN 476, SPAN 483, SPAN 484
4. At least 5 credits chosen from ANTH 404, ANTH 418, CHSTU 255, CHSTU 352, CHSTU 354, GEOG 330, GEOG 430, POL S 405; SISLA 322, SISLA 342, SISLA 355, SISLA 451, SISLA 480, or their joint-listed equivalents; SPAN/WOMEN 468
5. At least 15 additional credits chosen from the lists above or from the following: ANTH 458, ARCHY 304, ARCHY 476, CHSTU 256, CHSTU 405, CHSTU 491, CHSTU 498, GEOG 230, GEOG 371, GEOG 431, GEOG/SIS 335, HSTAA 284, HSTAA 482, HSTAA 483, HSTAA 485, HSTAA 486, HSTAA 487, HSTAA 488, HSTAA 283/CHSTU 180, HSTEU 361, HSTEU 462, MUSIC 300, MUSIC 317, MUSIC 319, SIS 201, SIS 401, SIS 455, SIS 480, SIS/ANTH/WOMEN 345, SISAF 444, SISLA 470 (max. 5 credits), SISLA 490, SISLA 492, SPAN 331, SPAN 461, SPAN 464, SPAN 465, SPAN 466, SPAN 478.
6. At least 20 of the 30 credits must be completed at the University of Washington (UW Foreign Study programs included).
7. Minimum grade of 2.0 required in each course applied toward the minor.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The majors offered in the School of International Studies emphasize development of critical thinking and provide a challenging framework for research and writing. Graduates attain competency in foreign language and an understanding of the political, economic and cultural underpinnings of the global system and specific world regions. This background lays a foundation for advanced study in professional and academic disciplines, and for careers in the evolving global community. Graduates work in a wide range of jobs, depending on their interests and skills, including: Foreign Service officers, international trade specialists, political analysts, human rights associates, research assistants, social studies and language teachers, international student advisers, foreign study coordinators, program officers/managers for international non-profits and NGOs, foreign exchange specialists, international sales representatives/managers, import/export brokers, marketing analysts, associate editors/publicists, international news writers/journalists.

* *Instructional and Research Facilities:* More than 1.5 million volumes in the University library system are related to international studies. The library receives more than 265 newspapers, 160 of which are foreign. Specialized facilities include the East Asia Library, with a comprehensive collection of manuscripts, books, and serials on China, Japan, and Korea. The University's library holds an extensive collection of books and serials relating to South Asia. The library participates in the U.S. Library of Congress Public Law 480 program, which supplies current publications from India, Pakistan, and Sri Lanka; and is a member of the South Asian Microfilm Program of the Center for Research Libraries, providing access to a large collection of microfilm newspapers, journals, and documents on South Asia.

The University of Washington is also a major center for research on Eastern Europe, Russia, and the independent states of the former Soviet Union, notably the Baltics and the countries of Central Asia. In addition to extensive holdings in Russian, East European, and Baltic language materials, the library has one of the best Central Asian language collections in the country and the largest collection of Latvian books outside Latvia. The strengths of the program are complemented by strong programs in East Asian and Middle Eastern Studies.

Jackson School undergraduates can draw upon an extensive roster of UW study-abroad programs to enrich their studies, including nearly 40 programs in Asia, over 80 in Europe, and another 40-45 programs in Latin America, the Middle East, and other regions of the world.

* *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* *Research, Internships, and Service Learning:* The School's Office of Career Services provides resources for students exploring job and

internship opportunities. The Jackson School sponsors the Asia Internship Program, through which students with language proficiency have served for three to nine months with organizations such as an international law firm in Seoul, a bank in Nagasaki, and large electronics companies in both Tokyo and Taipei. The School has limited funds available for students who serve as unpaid interns in nonprofit and governmental agencies. The Leslie Shedd Memorial Internship Fund honors a Jackson School alumna killed while serving with the State Department. The Dorothy Fosdick Internship Fund is sponsored by the Henry M. Jackson Foundation in memory of the senator's foreign policy adviser. The George E. Taylor Internship Endowment supports students engaged in community-based internships.

* *Department Scholarships:* George M. Beckmann Memorial Scholarship (undergraduate-Japan); Neal and Helen Fosseen Scholarship (undergraduate); Vincent H. Gowen Scholarship (China-undergraduate); Japan-America Student Conference Scholarship; Mitsui (USA) Foundation Scholarship; Ayako Betty Murakami Scholarship (Japan); Lorraine Sandler and Maurice Shurman Scholarships (undergraduate-Jewish Studies); Eugene and Marilyn D. Webb Scholarships (Comparative Religion); Kozo Yamamura Scholarship (Japan). See also the funding opportunities described under Internships.

* *Student Organizations/Associations:* Jackson School Student Association

Graduate Program

Graduate Program Information
111 Thomson, Box 353650
206-543-6001
jisisinfo@u.washington.edu

The Jackson School offers six area-studies programs that lead to a Master of Arts in International Studies degree. These include China Studies; Japan Studies; Korea Studies; Middle East Studies; Russian, East European, and Central Asian Studies; and South Asian Studies. Specific requirements vary from one program to another, but all stress interdisciplinary study within the context of the historical cultures, contemporary situations, and languages of the world areas. In addition, the Jackson School offers a program in Comparative Religion for the Master of Arts in International Studies.

The Jackson School also offers a general program in International Studies that concentrates on the interaction of international economic, political, and cultural processes with states and societies around the world. This program was developed in conjunction with several professional schools and is designed as a concurrent degree program.

Admission Requirements

Applicants must meet the requirements of the Graduate School: a 3.00 GPA in the last 90 quarter (60 semester) graded credits and a baccalaureate degree from an accredited university. Submission of the scores of the general Graduate Record Examination is required. Applicants must also meet the requirements of the specific Jackson School program to which they are applying. Most of them require or strongly recommend previous study of an appropriate foreign language.

Degree Requirements

Students must meet Graduate School requirements for the Master of Arts, as well as individual Jackson School program requirements. Programs are designed to be completed in two years.

Financial Aid

Financial support is available in the form of Title VI Foreign Language and Area Studies Fellowships. Some Jackson School programs have additional fellowships available for specific areas of study. Graduate students are also eligible for a limited number of teaching or research assistantships and readerships.

Research Facilities (East Asia)

Research and training facilities include the East Asia Library, with a comprehensive collection of manuscripts, books, and serials on China, Japan, and Korea. In addition, the University is affiliated with the Inter-University Program for Chinese Language Studies in Beijing, language programs in Japan and the People's Republic of China sponsored by the Council on International Educational Exchange, the Inter-University Center

for Japanese Language Studies in Yokohama, and other programs which provide intensive language training for advanced undergraduate and graduate students. The School has ongoing projects on China, Japan, and Korea in which advanced graduate students and recognized scholars from the United States and foreign institutions regularly participate.

See also descriptions of research facilities on Russia, East Europe, and Central Asia as well as South Asia under the appropriate headings below.

China Studies

R. Kent Guy, Chair

The China Studies program provides a broad understanding of the Chinese people and their culture, historical development, and contemporary problems. The curriculum emphasizes the attainment of facility in Chinese language, a grounding in history, and a familiarity with the approaches of the social sciences to China studies. The cultural aspects of China are covered through offerings of several departments, with special strengths in art history and literature. The breadth of offerings allows students to select courses to meet career goals in business, government, or other professions, or to prepare for further graduate study in an academic discipline.

Admission Requirements

See above under Graduate Program. While not required for admission, some previous study of Chinese language is highly recommended.

Degree Requirements

Chinese language training through the third year; two seminars: SISEA 521-522 (5 credits each) plus 26 credits in discipline study related to China from at least two different disciplines; two seminar papers or a thesis; comprehensive oral examination.

Comparative Religion

Martin S. Jaffee, Chair

The Comparative Religion program leading to the Master of Arts in International Studies offers an interdisciplinary curriculum in the study of religion, with several choices for areas of concentration. The required core seminars focus on methodology and comparative perspective in the study of religion. For the remaining course requirements, primary and secondary curricular concentrations are available in Buddhism, Hinduism, Judaism, Islam, Christianity, Biblical and ancient Near Eastern religion, and religion and culture; further secondary curricular concentrations are available in Greco-Roman religions, East Asian indigenous traditions, and African religious traditions.

Admission Requirements

See above under Graduate Program. The Comparative Religion faculty reserve the right to determine in each case whether an applicant has sufficient language preparation and background in the study of religion for acceptance into the program.

Degree Requirements

Completion of the third year in a language of the primary sources in the chosen concentration, and first-year reading proficiency in a secondary foreign language necessary for reading published research (e.g., German, French, Italian, Dutch, Spanish); certification of basic competency in the history of world religions; RELIG 501-502; one course focused on historical relations between religious traditions; at least four courses in a major concentration and two in a minor; one or two final research paper(s); and a comprehensive examination including both oral and written segments.

International Studies

Mary P. Callahan, Chair

The general program in International Studies provides students with broad knowledge and skills in analyzing international affairs. Designed for students entering many different professional fields, the program trains them in international and comparative studies in a multidisciplinary setting. Students are prepared to undertake sophisticated analyses of international affairs and typically will hold positions after graduation with the international divisions of federal and state governments, international divisions of banks,

trading companies, policy-study institutes, corporations with international operations, and international development and educational organizations. More than half of all students are enrolled in a concurrent graduate professional-degree program. This adds approximately one year to the student's course of study.

Admission Requirements

See above under Graduate Program. Those applying concurrently to a professional program (Business Administration, Public Affairs, Marine Affairs, Forest Resources, Law, or Public Health and Community Medicine) must first be accepted by the professional school. For non-concurrent applicants, preference is given to those who have a professional interest, or previous professional experience or education. Prior study of a foreign language and preparation in intermediate-level microeconomics and macroeconomics are highly recommended.

Degree Requirements

Japanese or Chinese language through the third year or any other modern foreign language through the second year; SIS 500, 501, 502, 511, 512, and 522 (3 credits each); courses in two of the following three fields: a regional studies field, a professional field, or a special topics field (minimum three classes -- 9 credits -- for each field); two seminar papers; and an oral examination. Students in concurrent graduate-degree programs also must meet Graduate School requirements for the second degree.

Japan Studies

Marie C. Anchordoguy, Chair

The graduate program in Japan Studies gives students in-depth knowledge of many facets of Japan, including its history, political economy, society, and language. Course work helps prepare students for careers in business, government, journalism, secondary-school teaching, and a wide variety of other professional fields. The program is specifically designed (1) for students with bachelor's degrees in a discipline who need language and interdisciplinary training on Japan to pursue their career goals, and (2) as preparation for doctoral work in an academic discipline involving Japan for students who have had little or no training on Japan or in the language. A concurrent degree program with the Business School (MAIS/MBA) is offered and other combinations (e.g., with Law) can be arranged.

Admission Requirements

See above under Graduate Program. At least one year of prior training in Japanese language is strongly recommended.

Degree Requirements

Japanese language training through the third year (15 credits minimum training at the UW); SISEA 555 (5 credits) and SISEA 559 (5); 26 credits in discipline study of Japan to include at least one history course and one social science course; essay of distinction; and an oral examination.

Korea Studies

Clark W. Sorensen, Chair

The graduate program in Korea Studies offers courses in Korean language, history, and society. Regular offerings are supplemented by visiting faculty from political science, economics and economic development, folklore, and literature. The program emphasizes the study of Korea in the context of East Asian civilization and the modern world economy, not simply as a single country in isolation from its neighbors. The objective of the program is to provide students with a broad background which will be of use for further graduate study, or in a variety of professions such as teaching, business, and government.

Admission Requirements

See above under Graduate Program. Previous language training is recommended.

Degree Requirements

Korean language through the third year of instruction (through the second year of instruction if the student is admitted with no previous language training); HSTAS 481-482, SISEA 584 (5 credits each), and SISEA 585 (6

credits); 15 credits in discipline study of East Asia or international studies; two seminar papers or an essay of distinction; comprehensive oral examination.

Middle Eastern Studies

Ellis Goldberg, Chair

The Middle East program is designed for students who wish to study the region within an interdisciplinary framework, focusing especially on the social, political, economic, and legal systems of the Middle East and/or Islamic Central Asia. To provide a thorough grounding in this region, students take courses in the social sciences, humanities, and a Middle Eastern or Central Asian language.

Admission Requirements

See above under Graduate Program. Although knowledge of a Middle Eastern or Central Asian language is not a prerequisite for admission, applicants are generally expected to have had at least the equivalent of one year's study of the language in which they plan to concentrate. Students accepted with no language training may wish to begin their language study in an intensive summer program.

Degree Requirements

Three 3-credit or two 5-credit Middle Eastern language courses beyond the second-year (native speakers as well as non-native speakers); 20 credits on the modern Middle East from at least two social science or humanities disciplines; one approved Jackson School course; two courses in one social science discipline or in one professional school other than courses taken for preceding requirements; either a thesis and an oral examination, or two seminar papers and a four-hour written examination.

Russian, East European, and Central Asian Studies

Stephen E. Hanson, Chair

Designed primarily for students with bachelor's degrees in a discipline, the program offers a background for professional pursuits in government and nongovernmental organizations, journalism, business, or teaching, or for advanced graduate study leading to the Ph.D. degree in a discipline. The program includes language training, a concentration of study in a chosen discipline, and a combination of courses in other disciplines that deal with aspects of the area. Students usually focus on one region (Russia, East Europe, the Baltics, or Central Asia), although the program provides flexibility to take courses on another region.

Admission Requirements

See above under Graduate Program. A prerequisite for all applicants is two years of college-level language courses or the equivalent. For those focusing on Russia the language must be Russian; for other regions of the former Soviet Union and East Europe, two years of a language of the region, or another relevant language.

Degree Requirements

Including the two years required for entry, four years of a language of the region being studied or two years each of two relevant languages (four years of Russian required for Russian focus); SISRE 501 and 502 (3 credits each); 30 credits in disciplines other than language, with 15-20 credits in a discipline of concentration and 10-15 credits in at least two additional disciplines; a thesis (9 credits of SISRE 700); a written examination in the discipline of concentration and an oral interdisciplinary examination.

Research Facilities

The University of Washington is a major center for research on Eastern Europe, Russia, and the independent states of the former Soviet Union, notably the Baltics and the countries of Central Asia. In addition to extensive holdings in Russian, East European, and Baltic language materials, the library has one of the best Central Asian language collections in the country and the largest collection of Latvian books outside Latvia. The strengths of the program are complemented by strong programs in East Asian and

South Asian Studies

K. Sivaramakrishnan, Chair

The South Asian Studies program has been designed for students whose career objectives involve teaching and research in a traditional discipline with geographical interests within South Asia (i.e., India, Pakistan, Bangladesh, Sri Lanka, Tibet, and Nepal); those planning to enter professional-training programs (e.g., education, business administration, journalism, law, or public affairs); or students planning a career in government service (e.g., the foreign service) who wish to acquire a special understanding of the South Asia area.

Admission Requirements

See above under Graduate Program.

Degree Requirements

Completion of the third year of a South Asian language to include at least 7 credits at the 400 level or above; SISSA 510 and 511 (5 credits each); 26 credits in coursework from at least two different departments, focused primarily on South Asia or in courses taught by South Asia faculty on topics relevant to the student's specializations (students may take a maximum of 10 credits not focused on South Asia, nor taught by South Asia faculty, to help fulfill disciplinary or professional objectives); two seminar papers; and a comprehensive oral examination.

Research Facilities

The University of Washington library holds an extensive collection of books and serials relating to South Asia. The library participates in the U.S. Library of Congress Public Law 480 program, which supplies current publications from India, Pakistan, and Sri Lanka; and is a member of the South Asian Microfilm Program of the Center for Research Libraries, providing access to a large collection of microfilm newspapers, journals, and documents on South Asia.

Course Descriptions

See page 364.

Labor Studies

Adviser
101 Smith, Box 353560
206-543-7946
pcls@u.washington.edu

Minor

The Labor Studies minor brings together a series of courses on labor in core social-science departments. It provides students with an interdisciplinary program of study focusing on the importance of labor to the economic, social, political, and cultural evolution of modern societies.

Minor Requirements: 30 credits, including HIST 249/POL S 249/SOC 266 (5 credits). Additional 25 credits (no more than 10 from any one department) from the following: HIST 449, HSTAA 450, HSTAA 480, POL S 405, POL S 447, SOC 447, SOC 466, AES 361, CHSTU 354, ECON 443, ECON 444, HRMOB 420. A minimum grade of 2.0 is required for each course applied toward the minor.

Law, Societies, and Justice

42 Gowen

The program in Law, Societies, and Justice provides an interdisciplinary liberal arts education focusing on the unique forms of social control, institutionalized disputing, and justice that we identify with law or legality. Courses inquire into the historically embedded principles and institutional practices associated with diverse legal domains -- constitutional, criminal, administrative, and civil law as well as fundamental human rights -- in the United States and throughout much of the world. The program encourages complex assessments of the workings and implications of law in society

according to standards that are both internal and external to the rule of law itself.

Undergraduate Program

Adviser
42 Gowen, Box 353530
206-543-2396
lsjadv@u.washington.edu

Law, Societies, and Justice offers the following programs of study:

- * The Bachelor of Arts degree with a major in law, societies, and justice.
- * A minor in law, societies, and justice
- * A minor in human rights involving courses at the three UW campuses
- * A minor in disability studies

Bachelor of Arts

Suggested First- and Second-Year College Courses: Courses that emphasize development of reading, writing, and especially analytical skills. Also, classes that provide background knowledge of modern world history, politics, institutions, and political theory.

Department Admission Requirements

1. Admission is competitive, based on the following: GPA, with emphasis on grades received in courses required for admission (applicants accepted normally present cumulative GPAs considerably above 2.50); personal statement representing the student's interest in and commitment to becoming a Law, Societies, and Justice major; other evidence of a commitment to the study of society, justice, and law. Junior standing preferred.
2. Completion of one of the following courses: LSJ 320/POL S 368 or LSJ 321/ANTH 323; LSJ 363/POL S 363 or LSJ/SIS 362; LSJ 375 or SOC 372.
3. Completion of one research methods or statistics class. See the program's Web site or advising office for a list of approved courses.
4. Completion of one English composition course. (Further evidence of writing skills in the social sciences is encouraged.)
5. A minimum cumulative GPA of 2.00 at the University of Washington.
6. . Students may apply in autumn, winter, or spring quarters. Applications for admission are due no later than the second Friday of each quarter. Students are notified of admissions decisions by the fifth week of the quarter in which they apply.

Major Requirements

58 credits as follows:

1. Completion of the four LSJ core courses: LSJ 320/POL S 368 or LSJ 321/ANTH 323; LSJ/POL S 363 or LSJ/SIS 362; LSJ/POL S 367; LSJ 375 or SOC 372 (20 credits)
2. One research methods or statistics course from approved list (4-5 credits)
3. Three courses from one of the three designated subfields of study (crime, social control, and justice; comparative legal institutions and politics; rights, resistance, and reconstructions in law) and two courses from one of the other two subfields. See the program's Web site or adviser for list of approved courses. (23 to 25 credits)
4. One LSJ senior seminar; and one field experience/internship, LSJ 401. Senior seminar cannot also count as an LSJ subfield course. (10 credits)
5. Students may use only one 3- or 4-credit course toward completion of the major.

Minor

Minor Requirements: 30 credits as follows:

1. Two courses from LSJ 320/POL S 368 or LSJ 321/ANTH 323; LSJ 363/POL S 363 or LSJ 362; LSJ 367/POL S 367; LSJ 375 or SOC 372 (10 credits).
2. Two courses from a single Law, Societies, and Justice major subfield. The major subfield areas are crime, social control, & justice; comparative legal institutions & politics; and rights, resistance, & reconstruction in law. Classes fulfilling the subfield requirement are outlined on the departmental web pages and handouts (6-10 credits).

3. One course from a second major subfield or from the Law, Societies, and Justice research methods list. The research methods list is outlined in departmental web pages and handouts (3-5 credits).
4. Elective courses from the list of LSJ core courses or LSJ major subfields. Only one course from the research methods list can be used to reach the total of 30 credits.

Disability Studies

Minor Requirements: 30 credits

1. *Core courses:* LSJ 332, LSJ 433, LSJ 434 (15 credits).
2. *Internship or independent study:* LSJ 332 (prerequisite course to completing an internship or independent study) (5 credits)
3. *Disability studies electives:* See LSJ adviser or Disability Studies program homepage for list of allowable classes (10 credits).

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The Law, Societies, and Justice curriculum emphasizes the development of a range of analytic and communicative skills. Courses challenge students to develop the capacities to: read and interpret texts, including theoretical, empirical and legal documents; comprehend and contrast arguments; develop and defend arguments; contrast theoretical arguments with empirical realities; assess contemporary practices of justice delivery against contemporary conceptions of justice. Students are required to express these skills in both verbal and written forms, through active class discussions and well-constructed writing assignments. The development of these skills assists students in a range of possible future endeavors, including a wide array of careers in law and justice.
- * *Instructional and Research Facilities:* Students have access to the Political Science computer lab and writing center for most classes. Research opportunities are available on an individual and group basis with many professors.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* LSJ was the first program in the social sciences to require an internship as part of its major. The internship aims: (1) to provide students with insights into the workings of law in practice; (2) to scrutinize and 'test' some of the theories and concepts found in the literature against 'real world' practice; (3) to advance career development and goals, and (4) to provide 100 hours of local community service. Students work with a variety of governmental and non-governmental agencies and organizations, including private law firms, federal law enforcement agencies, and social service organizations (see the Internship Listings for complete information). It is the student's responsibility to find an internship, although the LSJ adviser can help you find a suitable one. Students are required to write two papers according to specific guidelines for internship course credit.

Many of the LSJ faculty regularly invite majors to assist them in the development and execution of research endeavors. These provide students an unparalleled opportunity to understand the challenges and mechanics of high-level research.

- * *Department Scholarships:* None available, although the program does provide several awards with modest cash stipends to graduating seniors.
- * *Student Organizations/Associations:* Law, Societies, and Justice is a founding member of the National Consortium of Law and Society Programs. The program is presently reassessing the status of student associations and organizations.

Of Special Note: The required senior seminar emphasizes close reading of texts, active class discussions, and well-reasoned analytic writing, providing an unmatched opportunity to establish a close connection to faculty and other students, and to hone the analytic and communicative skills.

Course Descriptions

See page 415.

Linguistics

A210 Padelford

Linguistics is the scientific study of language, which is one of the most characteristic human attributes. In contrast to other language-related disciplines, linguistics is concerned with describing the rule-governed structures of languages, determining the extent to which these structures are universal or language-particular, positing constraints on possible linguistic structures, and explaining why there is only a fairly narrow range of possible human languages.

Undergraduate Program

Adviser
A215 Padelford, Box 354340
206-685-4846
lingadv@u.washington.edu

The Department of Linguistics offers the following programs of study:

- * The Bachelor of Arts degree with options in general linguistics and Romance linguistics
- * A minor in linguistics

Bachelor of Arts

General Linguistics

Suggested First- and Second-Year College Courses: LING 400 or other introductory course in linguistics. One year of a foreign language that belongs to a different family from the student's native language.

Department Admission Requirements

1. Completion of at least the third quarter, or equivalent, of a foreign language.
2. Completion of at least one writing (W) course and two quantitative and symbolic reasoning (Q/SR) courses, with a minimum grade of 2.0 in each course and a cumulative GPA of 2.50 in the three courses.
3. The department accepts students who meet the minimum requirements stated above, but recognizes that a GPA of 2.50 or higher is indicative of the motivation and academic skills needed for a reasonable probability of success in the program.

Major Requirements

1. LING 400 or other introductory course in linguistics
2. LING 450, LING 451, LING 461, LING 462
3. At least one of LING 432, LING 442, or LING 481
4. At least one year of each of two languages, one of which must belong to a different language family than the student's native language
5. 20 additional credits of departmentally approved courses in linguistics.

Romance Linguistics

Suggested First- and Second-Year Courses: Two college years of study in a Romance language; LING 400 or other introductory course in linguistics.

Department Admission Requirements

1. Completion of at least one year of college work in a single Romance language.
2. Completion of at least one writing (W) course and two quantitative and symbolic reasoning (QSR) courses, with a minimum grade of 2.0 in each course and a cumulative GPA of 2.50 in the three courses.
3. The department accepts students who meet the minimum requirements stated above, but recognizes that a GPA of 2.50 or higher is indicative of the motivation and academic skills needed for the reasonable probability of success in the program.

Major Requirements

1. LING 400 or another introductory course in linguistics
2. LING 450, LING 451, LING 461, and LING 462
3. ROLING 402
4. 15 credits at the 300 level or higher of one Romance language; ROLING 490; 20 additional credits of departmentally approved courses in linguistics.

Minor

Minor Requirements: 32 credits to include LING 400 or another introductory course in linguistics; three courses from LING 432, LING 442, LING 450, LING 451, LING 461, LING 462, or LING 481; 12 additional credits from a list of departmentally approved courses in linguistics, 6 of which must be upper-division courses.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The study of linguistics emphasizes formal reasoning and critical thinking skills. Linguists' skill sets include the ability to analyze sound, word, and sentence structures of individual languages; the ability to understand and account for how languages change in certain patterns; the ability to understand how social factors can affect language, how people learn their first or second languages; and the ability to find out and appreciate how apparently vastly different languages can be governed by the same set of rules. Linguistics is a valuable component of liberal education and vocationally can have applications wherever language itself becomes a matter of practical concern. Graduates have a good foundation for pursuing further training and careers in teaching languages, in areas of rehabilitative medicine such as audiology or speech therapy, in special education, in work with native peoples or with immigrant groups, in lexicographic work, in interpretation and translation, in work in computer science and artificial intelligence, or in academic disciplines such as psychology, philosophy, literature and language studies, where the contribution of linguistics is recognized. An undergraduate degree in linguistics from the UW also serves as preparation for graduate work in linguistics or language-related fields such as speech and hearing science or language teaching.

* *Instructional and Research Facilities:* The Language Learning Center located in Denny Hall provides audio and video services facilitating language learning. It also has a computer lab providing instructional software for linguistics and varieties of languages. Departmental facilities include a phonetics lab for students conducting phonetic experiments and doing digital acoustic analyses, a linguistics library that supplements the linguistics collection of the UW libraries and provides a quiet study place, and a computer lab for research in computational linguistics.

* *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* None offered

* *Department Scholarships:* None offered

* *Student Organizations/Associations:* The Linguistics Undergraduate Association (LingUA)

Graduate Program

Graduate Program Coordinator
A210B Padelford, Box 354340
206-543-2046
phoneme@u.washington.edu

The Department of Linguistics offers a program of study for graduate students leading to the degrees of Master of Arts and Doctor of Philosophy. The program is administered by the departmental faculty. The major interest of the core faculty lies in syntax, semantics, phonetics, phonology, sociolinguistics, computational linguistics, and in theoretical aspects of second-language acquisition. Students may specialize in general or in romance linguistics.

Some course work is also available in various cooperating departments. Among those fields represented outside the department are psycholinguistics, philosophy of language, speech synthesis, and the structure and history of a number of individual languages and language families.

Admission Requirements

At least one previous course in linguistics is highly recommended, as is proficiency in one language other than the student's native language. For a specialization in Romance, substantial upper-division coursework in a Romance language or equivalent is required. Two to three letters of recommendation (M.A.) or three letters of recommendation (Ph.D.) and Graduate Record Examination scores are required for all applicants.

Doctoral degree applicants should send the department a copy of their master's thesis or a paper of high quality, or both.

Master of Arts

- General Linguistics Option:**
 - Two courses each in syntax and phonetics/phonology.
 - One course in semantics.
 - Three courses not in categories (1) and (2) above.
 - Three courses at the 400 or 500 level. At least two of these must be 500-level courses for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement. Also note the University requirement for 9 credits at the 500 to 600 level.)
- Romance Linguistics Option:**
 - Three courses in syntax and phonetics/phonology.
 - ROLING 402, ROLING 551, LATIN 300
 - Six additional linguistics-related courses at the 400 or 500 level. One of these must be a 400-level FRLING or SPLING class and at least two of these must be 500-level classes for which papers or projects are required.
- No course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option.
- Demonstrated ability to read the linguistic literature in a language other than English. (For the Romance option, the demonstrated ability must be in a Romance language.) This can be satisfied at any time during the program by arrangement with the Graduate Program Coordinator.
- An M.A. exam in any areas in which the grade point average for the required course work in that area is below 3.30.
- Formation of a supervisory committee after the second quarter.
- A short M.A. thesis (30 to 50 pages), which will typically be an expansion of a term paper. Students must register for 9 credits of LING 700.
- All requirements must be completed within the equivalent of seven full-time quarters.

Doctor of Philosophy

Direct admission to the Ph.D. program will be considered on an individual basis for applicants holding a degree from a comparable M.A. thesis program in linguistics or a closely related field. Some such applicants may be granted admission directly into the Ph.D. program, with the stipulation that they make up one or more M.A.-level deficiencies.

Requirements for the Ph.D. degree are an M.A. degree plus the following:

- 35 additional credits of course work. At least 18 credits at the 500 level and above must be completed before the General Exam, 9 credits of which must follow the M.A. A minimum cumulative GPA of 3.00 is required for graduate course work.
- During the course of the entire M.A.-Ph.D. program, the student must have completed at least three courses each in syntax and phonetics/phonology and at least two courses in semantics, and have taken a total of five 500-level classes for which papers or projects are required. (LING 504, 505, 506, 507, 508, and 509 do not qualify for this requirement.) There is also a major, minor, and breadth requirement as follows: Major-six courses in the student's primary area of specialization; Minor-four courses in a second area (the major and minor together should form a coherent research area); Breadth-eight courses in other areas of the field. The student's supervisory committee will be the final judge of what courses might qualify to meet these requirements. However, it is worth noting that (a) courses fulfilling these requirements do not necessarily have to be offered from within the Department of Linguistics; (b) non-language instruction courses in a language area can fulfill the major or minor requirement; and (c) no course fulfilling any of the above requirements can be taken for the 2-credit (no paper) option.
- 27 credits of LING 800.
- Language Requirement:**
 - General Linguistics option: An exotic language requirement as follows: (a) for native speakers of an Indo-European language, a year of a non-Indo-European language; (b) for native speakers of a non-Indo-European language, a year of a language that is not English or in the same sub-family as their language. The student has the right to petition the supervisory committee to allow a language excluded in (a) or (b) above.
 - Romance Linguistics option: The completion of LATIN 301, as well as the demonstrated ability to read the linguistic literature in a Romance language.
- Two linguistic papers delivered at a colloquium or conference. Each will be evaluated by a member of the student's Ph.D. committee with expertise in the area of the paper. The evaluation may be either of the

oral presentation or of the paper in written form. The student should request evaluation by a faculty member for any paper to be considered for this requirement.

- By the end of the first quarter after admission to the Ph.D. program, the student will constitute a Ph.D. committee, in accord with Graduate School requirements. As part of this process, the student will work out with the committee members (by email or in person) a strategy for degree completion. The student's Ph.D. committee will administer a General Examination, which involves 2 parts:
 - Two general papers in different areas. At least one of the papers must be in some area of grammatical theory and one must be in the projected dissertation area. (One of the two papers, of course, can fulfill both the grammatical theory and the dissertation area requirements). At least one of the student's Ph.D. committee members must have expertise in each of the chosen areas.
 - An oral examination, in which the candidate is questioned on the two papers. The oral examination may not be scheduled until the committee has read the two papers and approved them as passing. The oral examination must be completed within the equivalent of 12 full-time quarters (excluding summer) after entrance into the M.A. program.
- Within six months of the oral examination, the student will present a formal dissertation proposal to the subset of Ph.D. committee members who constitute the Reading Committee along with a proposed calendar for completion of the dissertation.
- A Final Exam on the dissertation attended by the candidate's Supervisory Committee and open to others interested.

Course Descriptions

See page 376.

Mathematics

C138 Padelford

Mathematics is both a science and an art. Like any great art, mathematics has an intrinsic beauty and coherence that has attracted practitioners for centuries. Yet, unlike other arts, mathematics is a surprisingly effective tool for describing the natural world. Indeed, mathematics has come to serve as the foundation of modern science, through its language and results. Some mathematical results were initially developed in order to solve internally generated mathematical problems and only later found application in other disciplines; other mathematical results were inspired by the needs of these other disciplines. The two facets of mathematics -- tool of science and subject of inquiry for its own sake -- have come to be interwoven into a complex fabric.

Undergraduate Program

Adviser
C36 Padelford, Box 354350
206-543-6830
advising@math.washington.edu

The Department of Mathematics offers the following programs of study:

- * The Bachelor of Arts degree with a major in mathematics - standard program
- * The Bachelor of Arts degree with a major in mathematics - philosophy option
- * The Bachelor of Arts degree with a major in mathematics with an option designed specifically for students who plan to pursue secondary teaching careers.
- * The Bachelor of Science degree with a major in mathematics - standard program
- * The Bachelor of Science degree with a major in mathematics - comprehensive option
- * The Bachelor of Science degree with a major in applied and computational mathematical sciences (ACMS). The Department of Mathematics cooperates with the departments of Applied Mathematics, Computer Science and Engineering, and Statistics in offering this major. (See ACMS for requirements.)
- * A minor in mathematics

Bachelor of Arts

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126, or MATH 134, MATH 135, MATH 136.

Department Admission Requirements

Admission Requirements for Standard Option and Philosophy Option:

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136), and at least one 200- or 300-level mathematics course required for the degree, preferably MATH 307.
2. A minimum grade of 2.0 in each course to be offered as part of the major; a minimum overall GPA of 2.00 for all mathematics courses.
3. Application to the program should be made at the end of the sophomore year. Transfer students must be enrolled at the UW before applying to the major.

Admission Requirements for Teacher Preparation Option:

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136) and at least one 200- or 300-level mathematics course required for the degree, preferably MATH 307.
2. A minimum grade of 2.5 in each course to be offered as part of the major; a minimum overall GPA of 2.50 for all mathematics courses.
3. Application to the program should be made at the end of the sophomore year. Transfer students must be enrolled at the UW before applying to the major.

Major Requirements

Standard Option (50 credits):

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); MATH 307; MATH 205, MATH 308, or MATH 318; MATH 324; and 26 additional credits at the 300 level and above.
2. A minimum grade of 2.0 must be obtained in all mathematics courses presented to satisfy the mathematics requirement and in required related courses. A GPA of 2.00 or higher must be obtained in all mathematics courses taken at the UW.
3. At least 18 credits of graded mathematics courses numbered 300 or higher must be taken in residence at the UW.

Philosophy Option (58 credits):

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); MATH 300, MATH 318, MATH 327, MATH 328; five additional mathematics courses at the 300 or 400 level, including at least one two-quarter sequence at the 400 level other than MATH 407, MATH 408, MATH 409, or MATH 421, MATH 422.
2. PHIL 120 or an upper-level course in logic; PHIL 100, PHIL 160, or PHIL 240; one philosophy course at the 300 level; one philosophy course at the 400 level.

Teacher Preparation Option (58 credits):

1. MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136); MATH 307; MATH 308, MATH 318, or MATH 205; MATH 394, MATH 411, MATH 412, MATH 444, MATH 445, MATH 487; either MATH 354 and MATH 355 or PHYS 407, PHYS 408, PHYS 409; either STAT 311, MATH/STAT 390, or Q SCI 381; 6 credits of electives at the 300-level in MATH, AMATH, or STAT.
2. A minimum grade of 2.5 in all courses presented to satisfy the program requirements, with the exception of PHYS 407, PHYS 408, and PHYS 409, which require a grade of 3.0. At least 18 credits of graded mathematics courses numbered 300 or higher taken in residence at the UW.

Bachelor of Science

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126, or MATH 134, MATH 135, MATH 136.

Department Admission Requirements

A minimum grade of 2.0 in the following courses: MATH 124, MATH 125, MATH 126; any 300-level mathematics course. (See departmental adviser for information on Advanced Placement exemption.) A student can substitute the following courses, with a minimum grade of 2.0: MATH 134, MATH 135, MATH 136.

Major Requirements

Standard Option (66 credits):

1. A minimum grade of 2.0 in all courses applied toward the major.
2. A minimum GPA of 2.00 in all mathematics courses taken at the University. At least 18 credits from courses at the 300-level or higher, taken in residence at the University.
3. *Elementary Mathematics Core (21 credits):* MATH 124, MATH 125, MATH 126 (5, 5, 5); MATH 300 (3); MATH 324 (3). (MATH 134, MATH 135, MATH 136 may be substituted for MATH 124, MATH 125, MATH 126, MATH 307, and MATH 318.)
4. *Intermediate Mathematics Core (12 credits):* MATH 308 (3) or MATH 318 (3); MATH 326, MATH 327, MATH 328 (3, 3, 3). (MATH 334, MATH 335, MATH 336 may be substituted for MATH 300, MATH 309, MATH 324, MATH 326, MATH 327, and MATH 328.)
5. *Advanced Mathematics Core (21 credits):* At least seven courses from the following, from at least three different areas, and including at least two two-quarter sequences:
 - * *Algebra:* MATH 402, MATH 403, MATH 404 (3, 3, 3).
 - * *Analysis:* MATH 424, MATH 425, MATH 426 (3, 3, 3).
 - * *Geometry:* MATH 441, MATH 442, MATH 443 (3, 3, 3).
 - * *Other Analysis:* MATH 307, MATH 309 (3, 3); MATH 427, MATH 428, MATH 429 (3, 3, 3); MATH 435, MATH 436 (3, 3); MATH 438, MATH 439 (3, 3).
 - * *Probability:* MATH 394, MATH 395, MATH 396 (3, 3, 3); MATH 491, MATH 492 (3, 3).
 - * *Other Mathematics:* MATH 381 (3); MATH 407, MATH 408, MATH 409 (3, 3, 3); MATH 461, MATH 462 (3, 3); MATH 464, MATH 465, MATH 466 (3, 3, 3).
6. *Electives (12 credits):* Four additional mathematics courses, including a two-quarter sequence at the 300- or 400-level (teacher-preparation courses not allowed). Two of the four courses may be chosen from an approved list of courses offered by the departments of Applied Mathematics, Statistics, and Computer Science, or from certain other departments. The list is updated each year by the Undergraduate Program Coordinator; students may petition for approval of courses not on the list. Courses from the additional mathematics core sequences not used to fulfill core requirements can be used to fulfill the elective requirement.

Comprehensive Option (69 credits):

Emphasizes the fundamental subjects of algebra, analysis, and geometry and is designed to provide a deep understanding of these basic areas of modern mathematics. It lays a good foundation for more advanced study. For this option, the grade, elementary core, and elective requirements remain unchanged, with the same substitutions permitted from the accelerated/honors sequences. (Items 1, 2, 3, and 6 shown for the standard option, above.) MATH 318 is required in the intermediate core and the advanced mathematics core becomes the following:

5. *Advanced Mathematics Core, Comprehensive Option (24 credits):* At least eight courses from the following, including at least two in each of the first three areas. If only six courses are chosen from the first three areas, then the two courses chosen from the fourth area must form a two-quarter sequence:
 - * *Algebra:* MATH 402, 403, 404 (3, 3, 3).
 - * *Analysis:* MATH 424, 425, 426 (3, 3, 3).
 - * *Geometry:* MATH 441, 442, 443 (3, 3, 3).
 - * *Other Analysis:* MATH 307, 309 (3, 3); 427, 428, 429 (3, 3, 3); 435, 436 (3, 3); 438, 439 (3, 3).

Minor

Minor Requirements (33 credits):

1. *Core (21-25 credits):* MATH 124, MATH 125, MATH 126, MATH 307, and MATH 308 (or MATH 318) (21 credits) or MATH 134, MATH 135, MATH 136 (25 credits, including 10 advanced-placement credits)
2. *Electives (8-12 credits):* mathematics courses numbered 300 or higher.
3. At least 9 credits of courses numbered 300 or higher taken in residence at the UW. Minimum grade of 2.0 required for each course offered as part of the minor.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The study of mathematics emphasizes exposure to the core foundational areas of analysis, modern algebra, and geometry. A mathematician's skill set includes the technical

tools specific to each area as well as the development of critical thinking skills necessary for logical reasoning. Graduates have pursued careers in teaching, finance, science, engineering, and professional fields such as law and medicine.

- * *Instructional and Research Facilities:* Mathematical Research Library and Math Sciences Computing Center
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* When available, internship opportunities are passed on to students.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* MAA Student Chapter, Actuarial Club.

Graduate Program

Graduate Program Coordinator
C36 Padelford, Box 354350
206-543-6830
grads@math.washington.edu

The degrees of Master of Arts, Master of Science, and Doctor of Philosophy are offered. Opportunities are available within the department for study of abstract and applied mathematics for each of these degree programs. The Master of Arts degree is appropriate for students who need a broad background in advanced mathematics and who expect to continue working with mathematics of approximately the same level in their careers. The Master of Science degree is appropriate for students who expect to be working with more specialized mathematics of increasing order of complexity in their careers. The Doctor of Philosophy degree is the highest professional degree in mathematics. It is appropriate for students who plan on a career of research and/or teaching of mathematics at the highest levels.

Of the master's degrees, the M.S. non-thesis program has the most demanding course requirements and most closely matches the early stages of the Ph.D. program. Most students who enroll in the department begin their studies with the Ph.D. or M.S. non-thesis program in mind. The M.S. programs with options in numerical analysis or optimization provide more focused training in these directions, which can be useful for students seeking employment in certain industries; however, students intending to do research in these areas would normally follow the requirements of the Ph.D. program. Note that the department does not offer a master's degree in mathematics education.

Master of Arts

Admission Requirements

Bachelor of Arts degree with major in mathematics or equivalent background (minimum of 45 quarter credits or 30 semester credits of mathematics beyond college algebra).

Degree Requirements

Non-Thesis: A minimum of twelve approved one-quarter courses at the 400 or 500 level, including two courses in each of algebra, analysis, and one other field. The course total must include six courses chosen from the designated core graduate courses or, with prior approval of the graduate program coordinator, from other 500-level sequences. The six courses at the 500 level should be distributed over no more than three sequences.

Written examination in an area agreed upon by the student and the chair of the examining committee. Oral examination may be substituted with prior approval of the graduate program coordinator.

Master of Science

Admission Requirement

Bachelor of Science degree with major in mathematics, Bachelor of Arts degree with strong major in mathematics or equivalent background. In particular, at least one senior-level course in abstract algebra or real analysis is expected.

Degree Requirements

Thesis: A total of twelve numerically graded one-quarter courses from MATH 402, MATH 403, MATH 404; MATH 424, MATH 425, MATH 426; MATH 427, MATH 428, MATH 429; MATH 441, MATH 442, MATH 443; any 500-level mathematics course; AMATH 507; AMATH 584, AMATH 585, AMATH 586; plus 9 thesis credits (700). Other courses may be included in the total with prior approval of the graduate program coordinator. Courses to include at least two quarters from each of two designated core graduate courses and one other 500-level sequence. Transfer credits are not accepted at the 400 level; other transfer credits and substitutions are at the discretion of the graduate program coordinator.

The thesis, which is defended in an oral examination, should demonstrate the ability to do independent research.

Non-Thesis: A total of fifteen numerically graded one-quarter courses from MATH 402, MATH 403, MATH 404; MATH 424, MATH 425, MATH 426; MATH 427, MATH 428, MATH 429; MATH 441, MATH 442, MATH 443; any 500-level mathematics course; AMATH 507; AMATH 584, AMATH 585, AMATH 586. Other courses may be included in the total with prior approval of the graduate program coordinator. Courses to include at least two quarters from each of three designated core graduate courses, and in addition one three-quarter sequence of 500-level mathematics courses in an area of specialization approved by the graduate program coordinator and the chair of the student's examining committee.

Oral examination in the area of specialization on a topic agreed upon by the student and the chair of the examining committee, or the General Examination for the Ph.D. degree.

Numerical Analysis and Optimization Options, Non-thesis: A total of fifteen one-quarter courses, at least six of which are at the 500 level, chosen from MATH 424, MATH 425, MATH 426; MATH 427, MATH 428, MATH 429; MATH 438, MATH 439; MATH 441, MATH 442, MATH 443; MATH 461, MATH 462; MATH 491, MATH 492; any 500-level mathematics course; AMATH 507; AMATH 584, AMATH 585, AMATH 586. Other courses may be included in the total with prior approval of the graduate program coordinator. Courses to include four from AMATH 584-586 and MATH 594-596.

Oral examination in a special topic agreed upon by the student and the chair of the student's examining committee.

Doctor of Philosophy

Admission Requirements

Mathematical training equivalent to a bachelor's degree with strong major in mathematics, including rigorous course work in real analysis and abstract algebra.

Degree Requirements

90 credits minimum, as follows:

- * *Courses:* six three-quarter sequences numbered 500 or above or equivalent, including three sequences from the department's list of core graduate courses. The list of core courses includes MATH 504, MATH 505, MATH 506 (5,5,5); MATH 524, MATH 525, MATH 526 (5,5,5); MATH 534, MATH 535, MATH 536 (5,5,5); MATH 544, MATH 545, MATH 546 (5,5,5); MATH 554, MATH 555, MATH 556 (5,5,5). At least two sequences from this list must be satisfactorily completed during year one, and the third must be satisfactorily completed by the end of year two. A student may substitute a passing performance in a preliminary exam for satisfactory completion of the corresponding designated core course.
- * *Preliminary Examinations:* Pass three preliminary exams by September of the beginning of the third year.
- * *Foreign Language/Computer Requirement:* Pass either two foreign language exams or one foreign language exam and a computer programming exam. A PhD student is expected to pass one language or computer exam by the end of summer quarter after the second year, and the second by the end of summer quarter after the third year.
- * *General Examination:* An oral examination on a special area of intended research, given by a committee after the student has passed the preliminary exams and the language exams. This exam can be given only after two years of graduate study. Normally, it should be taken by the middle of the student's fourth year. Thesis: An original contribution to knowledge. 27 credits of MATH 800 required.
- * *Final Examination:* An oral exam given by a committee headed by the thesis supervisor.

Financial Support

Most graduate students in mathematics are supported by fellowships, research assistantships, and teaching assistantships. The workload of teaching assistants allows ample time for graduate courses and thesis work.

Course Descriptions

See page 380.

Microbiology

G315 Health Sciences

Microbiology is a natural science that deals with microorganisms such as bacteria, fungi, protozoa, algae, and viruses. It is concerned with the nature and properties of these organisms, their effects on humans and the environment, and how they can be exploited to provide useful products.

Undergraduate Program

Adviser

G315 Health Sciences, Box 357242

206-543-2572

advmicro@u.washington.edu

The Department of Microbiology offers the following programs of study:

- * The Bachelor of Science degree with a major in microbiology
- * A minor in microbiology

Bachelor of Science

Suggested First- and Second-Year Courses: PHYS 114, PHYS 115, PHYS 116, or PHYS 121, PHYS 122, PHYS 123; one of the following: MATH 112, MATH 124, MATH 144, Q SCI 381, or STAT 311.

MICROM 410, the first microbiology course for majors, is taken after completion of BIOL 200 and organic chemistry (CHEM 223 or CHEM 237). To graduate in four years, a student must complete introductory biology and organic chemistry before autumn quarter of the junior year.

MICROM 101, MICROM, 301, and MICROM 302, offered to non-majors, serve as introductory courses, but cannot be used to fulfill graduation requirements for a major in microbiology. MICROM 301 is a prerequisite for students applying to nursing, physical therapy, or dental school.

Department Admission Requirements

1. A minimum of 75 credits applicable to graduation, with a minimum cumulative GPA of 2.25 in prerequisite chemistry and biology courses.
2. Completion of the following prerequisite courses: BIOL 180, BIOL 200, BIOL 220; CHEM 142, CHEM 152, CHEM 162; CHEM 223, CHEM 224, or CHEM 237, CHEM 238, CHEM 239.

Major Requirements

Minimum 94 credits (including microbiology courses) in the biological, physical, and mathematical sciences, as follows:

1. BIOL 180, BIOL 200, BIOL 220, or equivalent (15 credits/one year)
2. *Inorganic:* CHEM 142, CHEM 152, CHEM 162 (16 credits) (or CHEM 145, CHEM 155); *Organic:* CHEM 223, CHEM 224 (8 credits) (or CHEM 237, CHEM 238, CHEM 239; or CHEM 335, CHEM 336, CHEM 337)
3. MICROM 402, MICROM 410, MICROM 411, MICROM 412, MICROM 431, MICROM 441, MICROM 442, MICROM 443, MICROM 496, and MICROM 445 or MICROM 450 (31 or 32 credits)
4. Approved microbiology electives (5 credits, not to include MICROM 101, MICROM 301, MICROM 302)
5. PHYS 114, PHYS 115 (8 credits) (or PHYS 121, PHYS 122) (PHYS 116 or PHYS 123 recommended)
6. Either MATH 112, MATH 124, MATH 127, MATH 144, Q SCI 381, or STAT 311 (5 credits)
7. BIOC 405, BIOC 406 (6 credits) (or BIOC 440, BIOC 441, BIOC 442)

8. For all required and elective microbiology courses used toward graduation, a minimum 2.25 cumulative GPA and a minimum grade of 1.8 in each course.
9. Transfer students must complete at least 20 of the required and elective microbiology credits at the UW.

Minor

Minor Requirements: 30 credits as follows:

1. 15 credits in biology and chemistry (BIOL 200 or BIOL 161-BIOL 162 or equivalent; CHEM 237 or CHEM 220, CHEM 221, or equivalent)
2. 15 credits in 400-level, graded microbiology courses, including at least one lab course (MICROM 402 or MICROM 431 or MICROM 443; MICROM 302 also acceptable), and both MICROM 410 and MICROM 496.
3. Minimum cumulative 2.00 GPA for all courses used toward the minor.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The department's objective is to provide a major with the best instruction possible in broad areas of microbiology so students qualify for a wide variety of positions with a terminal B.S. degree or qualify to pursue advanced degrees in graduate or professional schools.

Microbiology offers students an excellent education in the biology of microorganisms, namely bacteria, fungi, protozoa, and viruses. Through learning about the biology of these microorganisms and viruses, students more fully understand the pivotal position they occupy in establishing and maintaining our biosphere, their effects on human, animal, and plant life, and how the biological properties of certain microbes are exploited for certain purposes. Microorganisms are important in drinking water, wastewater and sewage treatment, production and spoilage of foods, production of antibiotics, bioremediation of toxic compounds, and genetic engineering of organisms having unique characteristics. Students gain insight into strategies used by microorganisms and viruses to cause disease and the mechanisms used by their host to defend themselves.

Graduates have found research positions in biotechnology and pharmaceutical companies, as well as in state and government positions hiring microbiologists. Students interested in a health profession or graduate program benefit from this program.

* *Instructional and Research Facilities:* Microbiology courses are taught using state-of-the-art facilities in the teaching wing of the Health Sciences building. Research labs are located in the Health Sciences, Fred Hutchinson Cancer Research Center, NW Regional Primate Research Center, and UW Rosen building.

* *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* *Research, Internships, and Service Learning:* MICROM 499, undergraduate laboratory research, is offered for credit. See adviser for details.

* *Department Scholarships:* The department offers four awards each year. More information is available at the department's Web site.

* *Student Organizations/Associations:* The Microphiles Club is open to all students. The club sponsors field trips to local biotech companies, speakers on topic such as research and career opportunities, graduate school, and peer teaching.

Graduate Program

For a description of the graduate program in microbiology, see the School of Medicine section.

Course Descriptions

See page 564.

Music

102 Music

The foremost goal of the School of Music is the discovery, preservation, and transmission of the practice and knowledge of music, as well as the role of music in culture and history. The school expands the frontiers of artistic enterprise and cultural knowledge through research, scholarship, and creative production, in its publications, performances, and teaching.

Through its instructional offerings, the School of Music provides opportunities for all students of the University of Washington to explore the role of music in the cultural nature of the world, past, present, and future. The school teaches students to think creatively and critically. The faculty provides professional training to musical performers as well as to academic scholars. The ultimate goal of the school is to instill the standards and ideals of excellence in both the artistic and scholarly endeavor of its students.

The School of Music is committed to furthering and transmitting technological advances through its research and instruction.

Because of its prominence in public performance, the School of Music has a unique external visibility, playing a vital role in the cultural life of the University, region, and beyond through the performance, creation, and study of music and culture. To that end, the school maintains strong links with professional arts organizations regionally as well as nationally.

Undergraduate Program

Adviser
116 Music, Box 353450
206-543-1239
musicadv@u.washington.edu

The School of Music offers the following programs of study:

- * The Bachelor of Arts degree with a major in music (music theory-history track; vocal track; instrumental track)
- * The Bachelor of Music degree with a major in composition, piano, string instruments, voice, organ, orchestral instruments, guitar, jazz studies, music education, and music history
- * The Bachelor of Arts degree with a major in general studies (ethnomusicology) (See general studies adviser in 171 Mary Gates Hall for requirements.)
- * A minor in music

Information Applicable to All Music Majors

Department Admission Requirements

All students must participate in an entrance audition and qualify at the MUSAP 320 level or better in their principal performance areas to be admitted as music majors and to receive private instruction. Entrance auditions are held in late September, late January, and as needed throughout the year. (See department web site for more information.) Major status in performance areas is accorded when, after admission to the College of Arts and Sciences is acknowledged and the required School of Music audition is successfully completed, the student commences applied-music study in a performance medium (e.g., voice) with an approved faculty member of the School of Music. In music history, music education, and composition, additional entrance requirements apply.

All music programs require instruction on an instrument. Auditions into freshman-level applied-music instruction (private lessons) are based on the assumption that a student's background includes four to eight years of private study on an instrument. Completion of a further two years of college-level private instruction does not automatically guarantee entry at the junior level of private instruction; placement is determined by an audition.

Most degree programs in the School of Music require one to two years of basic piano, to be completed during the course of study at the University.

Pre-Core Preparation

In preparation for beginning the music core course work, all students must be evaluated by placement test to determine their levels in music theory and music history. Students who have minimal background in these areas may

be required to take MUSIC 113/MUSIC 119 and MUSIC 120 before beginning the music core.

Transfer students who have had at least two quarters of music theory or music history are evaluated by a faculty member the quarter they are admitted to their program.

Music Core Requirements

The music core (36 credits), required in each of the undergraduate program tracks, is as follows: MUSIC 201/MUSIC 204, MUSIC 202/MUSIC 205, MUSIC 203/MUSIC 206; MUSIC 301/MUSIC 304, MUSIC 302/MUSIC 305, MUSIC 303/MUSIC 306; MUHST 210, MUHST 211, MUHST 212; at least 3 credits from among MUSIC 250, MUSIC 316, MUSIC 317, or any 400-level ethnomusicology course.

Grade Requirements

Undergraduate music majors are required to earn a minimum grade of 2.0 in each course (core and elective) counted toward music major requirements. An overall minimum GPA in music course work required for graduation is 2.50.

Bachelor of Arts

General Requirements

A minimum of 180 credits, of which 90 must be taken in departments other than the School of Music. Piano proficiency at MUSAP 135 level. All College of Arts and Sciences graduation requirements must be met. Cumulative GPA of 2.50 for all music courses and a minimum grade of 2.0 for each music course counted toward the major.

Major Requirements

Music Theory-History Track (63 credits): Music core, plus 12 credits of approved upper-level MUSIC or MUHST electives, 10 credits of MUSAP vocal or instrumental private applied instruction, 5 credits of MUSEN (ensembles).

Instrumental Track (69 credits): Music core, plus 6 credits of approved upper-level MUSIC or MUHST electives, 18 credits of MUSAP instrumental private applied instruction, and 9 credits in ensembles.

Vocal Track (75 credits): Music core, plus 6 credits of approved upper-level MUSIC or MUHST electives, 18 credits of MUSAP vocal private applied instruction, 6 credits of vocal diction, and 9 credits in ensembles. The vocal track also requires proficiency through the third quarter college level in two languages from French, German, and Italian.

Bachelor of Music

Admission Requirements

All students must participate in an entrance audition as described above. Students admitted into the BA program have the option to jury into the BM program at the end of the freshman and sophomore years. The Composition and Music Education programs have additional application requirements as described in the listings below.

General Requirements

A minimum of 180 credits, of which at least 60 must be taken in departments other than the School of Music. All College of Arts and Sciences degree requirements must be met (including Language Skills and Reasoning and Writing in Context), except that students need take only 60 credits in Areas of Knowledge, to include at least 20 credits each in two of the following three areas: Visual, Literary, & Performing Arts; Individuals & Societies; and the Natural World. Piano proficiency at MUSAP 235 level, a minimum grade of 2.0 in each music course counted toward the major, and a GPA of 2.50 in music courses is required for graduation.

Major Requirements (and Additional Admission Requirements, as noted)

Composition (114-120 credits)

Additional Admission Requirements: To be considered for admission to the Composition major, students must complete MUSIC 302 and MUSIC 305; MUHST 212; and MUSIC 216, MUSIC 217, MUSIC 218. Prospective

students must also submit a portfolio of recent compositions. Please see the adviser for more information on the application process.

Major Requirements: Music core (36 credits) plus MUSIC 216, MUSIC 217, MUSIC 218; PHYS 207; 18 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 380, MUSIC 381, MUSIC 382; MUSIC 400 or MUSIC 401; MUSIC 471 or MUSIC 472; MUSIC 490; 18 credits of private instruction in composition (MUSIC 391/MUSIC 491); 12-18 credits of MUSAP applied instruction; 6 credits of MUSEN ensembles; and one 400-level course in ethnomusicology. See the Music undergraduate adviser for more specific information on these requirements.

Guitar (120 credits)

Music core (36 credits) plus 9 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 487 or MUSIC 438; 36 credits of MUSAP applied instruction; 7 credits of electives; 2 credits of recitals; MUSIC 326, MUSIC 327, MUSIC 328; MUSIC 434, MUSIC 435, MUSIC 436; MUSIC 380, MUSIC 381, MUSIC 382; and 12 credits of MUSEN ensembles. See the Music undergraduate advisers for more specific information on these requirements.

Jazz Studies (120 credits)

Music core (36 credits) plus 9 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 319 or MUSIC 331; MUHST 425; MUSIC 336 and MUSIC 436; MUSIC 467, MUSIC 468, MUSIC 469; MUSIC 379, MUSIC 479; 6 credits of MUSIC 464; 10 credits of music electives; 30 credits of MUSAP applied instruction; 12 credits of MUSEN ensembles. See the Music undergraduate adviser for more specific information on these requirements.

Music Education (115-119 credits)

Additional Admission Requirements: To be considered for admission to the Music Education major, students must complete a separate Music Education audition and interview. Please see the adviser for more information on the application process.

Major Requirements: Music core (36 credits) plus MUSIC 300, MUSIC 350, MUSIC 351, MUSIC 352 (or MUSIC 380, MUSIC 381, MUSIC 382); MUSED 301; MUSED 304, MUSED 305, MUSED 306; MUSED 340; MUSED 403; MUSED 405 (or MUSEN 303); MUSED 440; MUSED 442 (or MUSED 443); MUSED 452; MUSED 465; 18 credits of MUSAP applied instruction; 6-7 credits of MUSEN ensembles; 12-14 credits of techniques courses; 3 credits of approved jazz coursework; EDC&I 494; and 3 credits of education electives. See the Music undergraduate adviser for more specific information on these requirements.

Orchestral Instruments (116 credits)

Music core (36 credits) plus 12 credits of division-approved upper-level MUSIC or MUHST electives; 36 credits of MUSAP applied instruction; 18 credits of electives; 2 credits of recitals; and 12 credits of MUSEN ensembles. See the Music undergraduate adviser for more specific information on these requirements.

Organ (120 credits)

Music core (36 credits) plus 12 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 487; 36 credits of MUSAP applied instruction; MUSIC 454; MUSIC 473 and MUSIC 474; MUSIC 458 and MUSIC 459; MUSIC 350, MUSIC 351, MUSIC 352; 1 credit of electives; 2 credits of recitals; and 12 credits of MUSEN ensembles. See the Music undergraduate adviser for more specific information on these requirements.

Piano (120 credits)

Music core (36 credits) plus 12 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 487; 36 credits of MUSAP applied instruction; MUSIC 434, 435, 436; MUSIC 326, MUSIC 327, MUSIC 328; 7 credits of electives; 2 credits of recitals; and 12 credits of MUSEN ensembles. See the Music undergraduate adviser for more specific information on these requirements.

Strings (117 credits)

Music core (36 credits) plus 15 credits of division-approved upper-level MUSIC or MUHST electives; 36 credits of MUSAP applied instruction; 6 credits of MUSIC 429; MUSIC 434, MUSIC 435, MUSIC 436; MUSIC 380; 3 credits of electives; 2 credits of recitals; and 12 credits of MUSEN

ensembles. See the Music undergraduate adviser for more specific information on these requirements.

Voice (119 credits)

Music core (36 credits) plus 12 credits of division-approved upper-level MUSIC or MUHST electives; MUSIC 307, MUSIC 308, MUSIC 309; MUSIC 326, MUSIC 327, MUSIC 328; MUSIC 434; MUSIC 460, MUSIC 461, and MUSIC 462; MUSIC 379 and MUSIC 479; 36 credits of MUSAP applied instruction; 10 credits of MUSEN ensembles; and 3 credits of music electives. Voice majors must be proficient through the third quarter college level in two languages from French, German, and Italian. See the Music undergraduate adviser for more specific information on these requirements.

Academic Options

Music History

Admission Requirements: In addition to the admission requirements for all music majors, shown above, formal application to the Music History division, to include verified completion of music core, 3.00 GPA in music core courses, 3.00 overall GPA, and a writing sample. Completion of minimum entrance requirements does not guarantee admission. The program of study and preparation of the senior thesis is developed in consultation with a Music History faculty adviser. Students who intend to pursue graduate studies are strongly advised to establish proficiency in German or French and to acquire some acquaintance with one or two additional foreign languages.

Major Requirements: 135 credits as follows: Music core (36 credits) plus 6 credits of 300-level MUHST electives; 36 credits of 400-level MUSIC or MUHST (minimum 12 courses); a 3-credit 400-level course in ethnomusicology; 3 credits of MUSIC 498; 18 credits of MUSAP applied instruction (3 years); 9 credits of MUSEN ensembles; and 24 credits of music electives.

Minor

Minor Requirements: A minimum of 25 credits of music courses (MUSIC, MUHST, MUSEN, MUSAP, or MUSED prefixes). Maximum 10 credits at the 100 level, minimum 15 credits at the 200 level or above including:

1. At least 4 credits from courses dealing with the elements of music (chosen from MUSIC 116, MUSIC 117, MUSIC 118, MUSIC 113/MUSIC 119, or MUSIC 120).
2. 5 credits from courses for nonmajors that focus on a particular music area (MUSIC 121, MUSIC 122, MUSIC 160, MUSIC 162, MUSIC 316, MUSIC 317, MUSIC 318, MUSIC 319, MUSIC 331).
3. Maximum 10 transfer credits (including maximum 5 transfer credits in performance lessons and ensembles) may count toward the minor.

Student Outcomes and Opportunities

* **Instructional and Research Facilities:** None.

* **Honors Options Available:** With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* **Research, Internships, and Service Learning:** None.

* **Department Scholarships:** None.

* **Student Organizations/Associations:**

- o Music Student Association (MSA): A group of undergraduate and graduate students from various divisions of the School of Music, working to foster a stronger sense of professional community, serve the larger cultural community, and build practical tools for encouraging and promoting student musicians' endeavors. For more information, contact sonare@u.washington.edu.
- o Ethnomusicology Student Association: A student association which deals with the concerns of the ethnomusicology division, as well as meeting socially. For further information, contact the division at 206-543-0949 or 64 Music Building.
- o Music Educators National Conference (MENC): A local chapter of this national scholarly organization of music educators is directly involved in annual state and regional meetings and events. Contact Professor Patricia Campbell (pcamp@u.washington.edu) for further details.

Of Special Note: Continuation of Major Status

Performance studies should begin after audition and acceptance, and continue each subsequent quarter of registration until the minimum program requirements for applied-music lessons have been met. Applied-music study should continue as long as the student is registered and in residence until the final approved recital is given. In order to retain major standing, the student must make and demonstrate consistent and acceptable progress at the annual required jury. Concurrent enrollment or participation in at least one School of Music ensemble is required during each quarter in which a student receives "MUSAP" applied-music instruction, at the 300 level and above, except for MUSAP 389/589. Also, basic piano proficiency is required for all majors. Non-keyboard majors must enroll in the MUSAP 133/235 series until appropriate proficiency is attained. Any departure from the above requirements must have the recommendation of the appropriate divisional chair and the written consent of the Director of the School of Music.

Graduate Program

Graduate Program Coordinator
116 Music, Box 353450
206-543-2726
musicadv@u.washington.edu

Graduate programs in the School of Music take into consideration the dual nature of music's subject matter. First, it is one of the creative arts, requiring constant renewal through the efforts of composers, performers, and teachers. Second, it is a branch of the humanities, subject to scholarly study and interpretation of its theoretical concepts and historical development. Each degree focuses on one of these areas.

Master of Music or Doctor of Musical Arts

- * Choral Conducting
- * Composition
- * Instrumental Conducting
- * Opera Production
- * Performance piano, organ, harpsichord, voice, strings, brass, woodwinds, percussion, harp

Master of Arts or Doctor of Philosophy

- * Ethnomusicology
- * Music Education
- * Music History
- * Music Theory

Master of Arts

Admission Requirements

- * A baccalaureate degree from an accredited U.S. institution or its equivalent from a foreign institution. Performance programs expect that applicants have a Bachelor's degree in music or the equivalent experience and training in the field.
- * Minimum GPA of 3.00 or B average in the most recent two years of study.
- * Applicants are required to submit scores from the Graduate Record Exam (GRE) except if applying to a Master of Music or Doctor of Musical Arts degree program in any area besides composition, or if the applicant holds an earned doctorate from an accredited institution.

International Applicants

- * International applicants must consult the online Preliminary Evaluation Process before proceeding with the application process.
- * International applicants whose native language is not English are required to submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be less than two years old. Minimum scores are 580 for the paper test and 237 for the computer test.

Degree Requirements

45 credits minimum, as follows:

- * All students must complete a minimum of 45 credits as specified for their particular degree program; of these credits, 18 credits must be numerically graded and 18 credits must be at the 500-level
- * Demonstrate proficiency in a foreign language as required by the degree program

- * Prepare a thesis and pass an oral thesis defense or pass an examination based on approximately 10 topics
- * Complete all work for the master's degree within six years. This includes applicable work transferred from other institutions (max. 6 credits transferable) and time spent on leave.

Master of Music

Admission Requirements

- * A baccalaureate degree from an accredited U.S. institution or its equivalent from a foreign institution. Performance programs expect that applicants have a Bachelor's degree in music or the equivalent experience and training in the field.
- * A minimum GPA of 3.00 or B average in the most recent two years of study.
- * Applicants are required to submit scores from the Graduate Record Exam (GRE) except if applying to a Master of Music or Doctor of Musical Arts degree program in any area besides composition, or if the applicant holds an earned doctorate from an accredited institution.

International Applicants

- * International applicants must consult the online Preliminary Evaluation Process before proceeding with the application process.
- * International applicants whose native language is not English are required to submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be less than two years old. Minimum scores are 580 for the paper test and 237 for the computer test.

Entrance Auditions: Before acceptance into a performance-based School of Music graduate program, applicants need to pass an entrance audition in their major performance area.

Degree Requirements

All students in the performance degree programs (MM, DMA) are expected to enroll in music applied lessons (MUSAP courses at the 500-level) until all recital requirements are met. The School of Music requires that all students registered for music applied lessons must also be enrolled in an ensemble (MUSEN 5XX).

All students working toward a master's degree must meet the following requirements:

- * Complete a minimum of 45 credits as specified for their particular degree program; of these credits, 18 credits must be numerically graded and 18 credits must be at the 500-level
- * Demonstrate proficiency in a foreign language as required by the degree program
- * Prepare a thesis and pass an oral thesis defense or pass an examination based on approximately ten topics
- * Complete all work for the master's degree within six years. This includes applicable work transferred from other institutions (max. 6 credits transferable) and time spent on leave.

Doctor of Music Arts

Admission Requirements

- * A baccalaureate degree from an accredited U.S. institution or its equivalent from a foreign institution. Performance programs expect that applicants have a Bachelor's degree in music or the equivalent experience and training in the field.
- * A minimum GPA of 3.00 or B average in the most recent two years of study.
- * Applicants are required to submit scores from the Graduate Record Exam (GRE) except if applying to a Master of Music or Doctor of Musical Arts degree program in any area besides composition, or if the applicant holds an earned doctorate from an accredited institution.

International Applicants

- * International applicants must consult the online Preliminary Evaluation Process before proceeding with the application process.
- * International applicants whose native language is not English are required to submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be less than two years old. Minimum scores are 580 for the paper test and 237 for the computer test.

Entrance Auditions: Before acceptance into a performance-based School of Music graduate program, applicants need to pass an entrance audition in their major performance area.

Degree Requirements

All students in the performance degree programs (MM, DMA) are expected to enroll in music applied lessons (MUSAP courses at the 500-level) until all recital requirements are met. The School of Music requires that all students registered for music applied lessons must also be enrolled in an ensemble (MUSEN 5XX).

Specific degree requirements are as follows:

- * A minimum of 90 credits of resident study with at least 60 registered credits from the UW
- * Demonstration of a reading knowledge of one or more foreign languages as required by the particular degree program
- * Complete performance requirements required for the specific degree
- * Pass the General Examination for admission to candidacy; may consist of written and oral examinations based on approximately twenty topics (depending on degree program)
- * Prepare a dissertation which is a significant contribution to knowledge in a specific field and which clearly indicates training and research
- * Pass a Final Examination devoted to the dissertation in the field with which it is concerned
- * Complete all work for the doctoral degree within ten years. Applicable work from the master's degree and work transferred from the other institutions must fall within the ten-year period, including time spent on leave and away from the program. Up to thirty credits from an approved master's degree may be counted toward the 90 credits required for the degree. (Master's degree credits are applied toward the general elective requirements of the degree plan.)

Doctor of Philosophy

Admission Requirements

- * A baccalaureate degree from an accredited U.S. institution or its equivalent from a foreign institution. Performance programs expect that applicants have a Bachelor's degree in music or the equivalent experience and training in the field.
- * A minimum GPA of 3.00 or B average in the most recent two years of study.
- * Applicants are required to submit scores from the Graduate Record Exam (GRE) except if applying to a Master of Music or Doctor of Musical Arts degree program in any area besides composition, or if the applicant holds an earned doctorate from an accredited institution.

International Applicants

- * International applicants must consult the online Preliminary Evaluation Process before proceeding with the application process.
- * International applicants whose native language is not English are required to submit scores from the Test of English as a Foreign Language (TOEFL). Scores must be less than two years old. Minimum scores are 580 for the paper test and 237 for the computer test.

Degree Requirements

- * Present a minimum of 90 credits of resident study with at least 60 registered credits from the UW
- * Demonstrate a reading knowledge of one or more foreign languages as required by the particular degree program
- * Complete performance requirements required for the specific degree
- * Pass the General Examination for admission to candidacy; may consist of written and oral examinations based on approximately twenty topics (depending on degree program) Prepare a dissertation which is a significant contribution to knowledge in a specific field and which clearly indicates training and research
- * Pass a Final Examination devoted to the dissertation in the field with which it is concerned
- * Complete all work for the doctoral degree within ten years. Applicable work from the master's degree and work transferred from the other institutions must fall within the ten-year period, including time spent on leave and away from the program. Up to thirty credits from an approved master's degree may be counted toward the 90 credits required for the degree. (Master's degree credits are applied toward the general elective requirements of the degree plan.)

Financial Aid

A limited number of teaching and staff assistantships (including accompanying) are available. Competitive auditions for performance scholarships for new and returning students are held each year. See the School's Web site (above) for more information about applications and audition dates. Research Facilities

The Music Building contains the music library, an electronic composition laboratory, a listening center, and the ethnomusicology archives, as well as the studio, practice, and classroom facilities of a modern music department.

Ensembles available for student participation include University Symphony Orchestra, University Chorale, Opera Chorus, Contemporary Group, and Baroque Ensemble, as well as non-Western ensembles with visiting artists from around the globe.

Course Descriptions

See page 385.

Near Eastern Languages and Civilization

229 Denny

Near Eastern languages and civilization focuses on the languages and civilizations of the Near East with an emphasis on the ancient and medieval roots of these civilizations as well as more recent cultural developments. Each language offered represents a major literary tradition. Arabic, Persian, Turkish, and Central Asian Turkic are the languages of the most significant literary manifestations of Islamic civilization. Hebrew and Aramaic are the languages of the Bible and are central to Judaism and Jewish culture. Egyptian languages (Coptic, Hieroglyphic) and other Mesopotamian and Mediterranean languages (Akkadian, Ugaritic, Phoenician) are important to the ancient and Christian cultures of the Near East. These languages are taught in conjunction with courses on the social, cultural, and religious history of the Near East, providing students with a broad understanding and solid foundation for more advanced studies or professional career development.

Undergraduate Program

Adviser
244 Denny, Box 353120
206-685-3743
nelcua@u.washington.edu

The department offers the following programs of study:

- * The Bachelor of Arts degree with a major in Near Eastern languages and civilization with options in Near Eastern languages and civilization, Near Eastern culture and civilization, comparative Islamic studies, and Biblical and ancient studies
- * A minor in Near Eastern languages and civilization

Bachelor of Arts

Suggested First- and Second-Year College Courses: Courses in any discipline that deals with the Near East, e.g., history, political science, economics. Courses in writing, literature, French, German, and Russian are also recommended.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Near Eastern Studies -- Languages and Civilization

69 credits as follows:

1. Two years of one Near Eastern language, or its equivalent as evidenced by examination
2. At least 9 credits in advanced literature or text courses in that language

3. NEAR E 210
4. One of the following: NEAR E 211, NEAR E 240, or RELIG 210
5. An approved program of 20 further credits in courses offered by the department or courses on the Near East offered by other departments, or both

Near Eastern Studies -- Culture and Civilization

73 credits as follows:

1. Two years of one Near Eastern language or its equivalent as evidenced by examination
2. NEAR E 210 or (with approval of adviser) NEAR E 220
3. One of the following: NEAR E 211, NEAR E 240, or RELIG 210
4. An approved program of 20 further credits in Near Eastern courses including at least one course from each of the following areas: Near Eastern civilization, Near Eastern religion, Near Eastern literature in translation
5. 8 credits in non-language, upper-division courses related to the Near East in the department or in other departments
6. A senior essay on a topic of Near Eastern civilization (5 credits).

Near Eastern Studies -- Comparative Islamic Studies

70 credits as follows:

1. Two years of one of the following languages or its equivalent as evidenced by examination: Arabic, Persian, Turkish, Uzbek, Kazakh, or other appropriate languages with approval of adviser
2. NEAR E 210
3. NEAR E 212 or 240
4. An approved program of 10 credits in courses in Islamic religious traditions and texts, and 15 credits in history, society and culture of Islam
5. A senior essay on a topic in comparative Islamic studies (5 credits).

Near Eastern Studies -- Biblical and Ancient

73 credits as follows:

1. Two years of Biblical Hebrew or its equivalent as evidenced by examination (alternatively, a student may satisfy this language requirement by combining a minimum of four quarters of Biblical Hebrew with two quarters of other ancient Near Eastern languages, including Aramaic, hieroglyphic Egyptian, Coptic, Akkadian, second-year Greek, or other appropriate languages as approved by adviser)
2. NEAR E 220 and NEAR E 240
3. An approved program of 20 credits in courses in ancient Near Eastern history, society and culture, and ancient Near Eastern literature in translation
4. 8 credits in non-language, upper-division Near Eastern courses related to the ancient Near East
5. A senior essay on a topic in biblical and ancient Near Eastern studies (5 credits).

Minor

Minor Requirements: 25 credits as follows:

1. NEAR E 210 or NEAR E 220
2. One course from NEAR E 211, NEAR E 240, RELIG 210
3. Additional credits from Near Eastern civilization or language courses (may not include language courses at the beginning or intermediate level).

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The NELC undergraduate degree offers a liberal arts education with a particular focus on the study of cultures and languages of the Near East and Central Asia. Educational outcomes from this degree serve a broad spectrum of undergraduates, ranging from those intending to begin the acquisition of specific linguistic and cultural proficiencies for the purpose of pursuing some career, academic or otherwise, related to these regions, to students for whom the Near East and/or Central Asia are regions with histories and cultures that are of special intellectual or personal interest. Students often combine Near Eastern Studies as a double major with some other degree program that may be in a quite different discipline. For these students the NELC undergraduate major offers the important opportunity, as a core element in a broader liberal arts education, for expanding their cultural vision and understanding in ways made possible only through

serious study of a language and literature other than one's own. Graduates from the B.A. degree have followed a wide range of post-baccalaureate paths, including further graduate study in the humanities or social sciences, professional degree programs in law or medicine, and employment with government or non-governmental organizations.

- * *Instructional and Research Facilities:* The department draws on collections of books, serials, and other resources in the UW libraries that are unusually rich in the quantity and quality of items relating to Near Eastern and Central Asian languages and cultures. Students in the department's language classes make use of the University's well-equipped Language Learning Center.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* None offered
- * *Department Scholarships:* See departmental website for most current information.
- * *Student Organizations/Associations:* There are no formal student organizations in the department, but the department frequently sponsors educational and cultural events organized by students and faculty involved in interest groups such as the Central Asian Circle or the Persian Circle.

Graduate Program

Graduate Program Coordinator
M29A Denny, Box 353120
206-685-3800
neareast@u.washington.edu

Master of Arts

The Department of Near Eastern Languages and Civilization offers a graduate program of studies leading to the Master of Arts degree. The program is designed to provide students with advanced training in at least one Near Eastern language and in a specific field of specialization. Students may concentrate in Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic and may choose as their field of specialization a civilization or literature related to their language of concentration. The program is intended not only for those students who wish to continue their studies at the doctoral level but also for students who wish to pursue careers in government or business.

Admission Requirements

- * Statement of purpose
- * Sample of written academic work
- * Three letters of recommendation, of which at least two must attest to scholarly ability
- * Official transcripts from all collegiate institutions attended
- * Although knowledge of a Near Eastern language is not a prerequisite for admission, applicants are generally expected to have had the equivalent of two years' study of the language in which they plan to concentrate.
- * A bachelor's degree from an accredited institution
- * A minimum GPA of 3.00 or B for last 90 quarter (60 semester) credits
- * GRE scores
- * TOEFL scores for International Students

Degree Requirements

36 credits, as follows:

- * Reading knowledge of French or German; or, with the prior approval of the student's M.A. Committee, any other language pertinent to the research in the student's field of study. Normally, to satisfy this requirement, the student must pass a reading exam before beginning the second year of study towards the M.A.
- * A seminar paper representing the student's best work
- * Coursework determined in consultation with adviser to prepare for written examinations.
- * A written examination consisting of four parts: (1) general culture of the Near East, (2) student's field of specialization, (3) student's language of concentration, (4) second Near Eastern language related to the language of concentration.

Doctor of Philosophy

Some of the department faculty are part of an interdisciplinary faculty group which offers doctoral study in Near and Middle Eastern Studies. The program is located administratively within the Graduate School. For a description of the program, see the Interdisciplinary Graduate Degree Programs section of this catalog.

Summer Programs

The department offers Summer Intensive Language programs in Arabic, Hebrew, and Central Asian languages (Uzbek, Kazakh, Tajik, and others). Research Facilities

The University of Washington Libraries holds an extensive collection of books and materials in the languages of the Near East, the Turkic regions of Central Asia, and in European languages on Near Eastern and Central Asian Turkic subjects. Candidates for the master's degree as well as doctoral students will find in the collection adequate resources for their research. The library participated in the Library of Congress Middle East Cooperative program for the acquisition of Arabic serials, and the Library of Congress Cooperative program for Pakistan for the purchase of Persian books and serials. The library staff includes Near East and Central Asia specialists responsible for acquiring and cataloging the collection. The library maintains book exchanges with the Central Asian republics, some of these beginning as early as 1961. They are handled through the Near East and Slavic Sections of the University's Suzzallo Library. Among its staff are an exchange librarian and a specialist trained in Central Asian Turkic languages. A book exchange with Xinjiang is administered through the East Asia Library.

Financial Aid

A limited number of teaching assistantships are available for graduate students in the department who are fluent in speaking and writing a Near Eastern language. A limited number of graduate fellowships are also available.

Exchange Agreements

The department participates actively in exchange programs involving institutions abroad, sending students for language and cultural study and research to a variety of locations, and training many students from institutions overseas. Students take advantage of existing formal UW exchange agreements with several universities in North Africa and the Middle East, such as American University in Cairo; Al-Akhawayn University in Ifrane, Morocco; Yarmouk University and Mu'tah University in Jordan; American University in Beirut; Hebrew University in Jerusalem; and Bogazici University in Istanbul. There have also been departmental-level exchange agreements with Xinjiang University in Urumchi, China (for Uighur, Kazakh, Kirghiz), or institutions in Central Asia such as Tashkent State University, the Humanities University of Bishkek, Kyrgyzstan, or Kyrgyz State National University, Bishkek. NELC students also study at other institutions in which there are not currently formal exchanges, such as the University of Damascus (for the study of Arabic and related subjects).

Course Descriptions

See page 395.

Neurobiology

318 Hitchcock

Neurobiology offers students an intense introduction to the study of nervous systems. Faculty in both the College of Arts and Sciences and the School of Medicine teach courses in the major. Students study the cellular and molecular properties of single nerve cells and the connections among them and learn how these properties determine animal behavior and human disease.

Undergraduate Program

Adviser
318 Hitchcock, Box 355320
206-616-3982

The Neurobiology Program offers the following program of study:

* The Bachelor of Science degree with a major in neurobiology

Bachelor of Science

Department Admission Requirements

- BIOL 180, BIOL 200, BIOL 220, with minimum 2.0 grade in each
- Completion of most supporting course work in physics, math, and chemistry recommended (see specific course lists, below), with minimum 2.50 GPA in any such work completed at time of application
- Admission is competitive; meeting minimum standards guarantees consideration but not acceptance. Early application is encouraged and may increase chances for acceptance. Since the program uses rolling admission, there is no specific deadline for applying. See adviser for details about applying.

Major Requirements

Minimum 86 credits, as follows:

- Supporting course work (minimum 48 credits):*
 - Chemistry:* Pathway 1 -- CHEM 120, CHEM 220, CHEM 221; Pathway 2 (recommended) -- CHEM 142, CHEM 152, CHEM 162 (or CHEM 145, CHEM 155, CHEM 165); and CHEM 223, CHEM 224 (or CHEM 237, CHEM 238, CHEM 239) (or CHEM 335, CHEM 336, CHEM 337) (labs not required) (15 - 27 credits)
 - Physics:* Pathway 1 -- PHYS 114, PHYS 115; Pathway 2 (recommended) -- PHYS 121, PHYS 122. (8 to 10 credits)
 - Mathematics:* Two quarters of calculus (MATH 124, MATH 125, or MATH 144, MATH 145, or Q SCI 291, Q SCI 292)
 - Introductory Biology (minimum 15 credits):* BIOL 180, BIOL 200, BIOL 220
- Introduction to Neurobiology (10 credits):* NBIO 301, NBIO 302.
- Advanced courses in neurobiology (12 credits):* NBIO 401, NBIO 402, NBIO 403, NBIO 404.
- Electives:* Minimum 16 credits from a wide variety of 400-level courses in the biological sciences. See adviser for list of courses. Courses not listed may be allowed with permission of program director. Students may apply up to 7 credits of undergraduate research toward the 16 elective credits.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Throughout the core sequence of neurobiology, students gain a deep understanding of the basic concepts of nervous system function and learn many of the basic techniques used to study nerve cells. Students also learn how to analyze neurophysiological data, and compose and present results. Graduates pursue careers in medicine, public health, education, pharmaceutical sales, computing, and graduate study.
- * *Instructional and Research Facilities:* Labs are required with introductory courses. NBIO 301 and NBIO 302. The program offers state-of-the-art facilities and equipment for each course.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Most neurobiology students participate in undergraduate research with faculty from both the College of Arts and Sciences and the School of Medicine.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* Beta Beta Beta, the honor society for biological study; Alpha Epsilon Delta, the national premedical honorary society.

Course Descriptions

See page 401.

Philosophy

345 Savery

Philosophy is the study of the most fundamental issues concerning reality, knowledge, and value, and of the basic concepts, principles, and arguments of the major intellectual disciplines. Its fields include metaphysics, epistemology, logic, ethics, history of philosophy, political philosophy, aesthetics, philosophy of science, philosophy of mind, philosophy of language, philosophy of law, and philosophy of religion.

Undergraduate Program

Adviser
345 Savery, Box 353350
206-616-1488
philinfo@u.washington.edu

The Department of Philosophy offers the following programs of study:

- * The Bachelor of Arts degree with a major in philosophy
- * The Bachelor of Arts degree with a major in history and philosophy of science, offered jointly with the Department of History
- * A minor in philosophy

Bachelor of Arts

Philosophy

Suggested First- and Second-Year College Courses: Introductory courses in symbolic logic, social philosophy, major problems of philosophy, and history of philosophy. Courses to develop writing skills, as well as language courses, especially Greek, French, or German. Mathematics courses through calculus.

Department Admission Requirements

2.00 cumulative GPA and completion of 10 credits of philosophy course work.

Major Requirements

50 credits, to include:

1. PHIL 120 or an upper-division course in logic
2. One course from PHIL 320, PHIL 330, PHIL 335, or PHIL 340 (undergraduate adviser must approve substitutions)
3. One course from PHIL 322, PHIL 332, PHIL 342, or 400-level courses in the same areas (undergraduate adviser must approve substitutions)
4. At least four UW philosophy courses at the 400 level, excluding PHIL 484
5. At least 25 credits at the UW
6. Minimum cumulative GPA of 2.00 for all philosophy courses taken.

History and Philosophy of Science

Suggested First- and Second-Year College Courses: PHIL 120, PHIL 160. Courses that develop writing skills. Introductory science courses and mathematics courses through calculus.

Department Admission Requirements

1. HIST 311, HIST 312; PHIL 160 or PHIL 460; PHIL 120, each with a minimum grade of 2.0.
2. Completion of 10 credits toward the Natural World (science) requirement (see below), each course with a minimum grade of 2.0.
3. Minimum UW GPA of 2.00.
4. Completion of 10 credits of composition/writing courses with a minimum grade of 2.0 for each course. This requirement may be met by a freshman English composition course, a "W" course, or any course in which the student has written a graded paper (to be reviewed by HPS faculty) of at least 10 pages.

Major Requirements

85 credits as follows:

1. *Core Courses:* HIST 311, HIST 312, HIST 390; PHIL 160 or PHIL 460; PHIL 120 (25 credits). A minimum grade of 2.0 in each course and an overall minimum GPA of 2.50.

2. *Electives:* 25 credits from the following, of which at least 10 must be PHIL courses and at least 5 must be HIST courses (or others upon petition): ESS 404, HIST 211, HIST 215, HIST 310, HIST 313 (or ASTR 313), HIST 314, HIST 315, HIST 316, HIST 317 (also MHE 422), HIST 318 (also MHE 424), HIST 412; PHIL 112, PHIL 350, PHIL 360, PHIL 406, PHIL 450, PHIL 460 (if PHIL 160 has been taken), PHIL 464, PHIL 466, PHIL 473, PHIL 481, PHIL 482, PHIL 483. A minimum grade of 2.0 in each class.
3. *Capstone:* Completion of HPS 400, with a minimum grade of 2.0 (5 credits).
4. *Science Component:* 30 credits of Natural World (NW) courses from anthropology, astronomy, atmospheric sciences, biology, chemistry, computer science, earth and space sciences, economics, environmental studies, mathematics, physics, psychology, and sociology, with a minimum GPA of 2.50 in these courses and a minimum grade of 2.0 in each course. At least 15 of the credits must be outside mathematics.

Minor

Minor Requirements: 30 credits, to include:

1. PHIL 115 or PHIL 120, or an upper-division course in logic
2. At least 15 UW philosophy credits at the 300 level or above, excluding PHIL 484.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Graduates of the Department of Philosophy acquire considerable skills in abstract thinking, analysis, and critical writing (constructing and critiquing arguments). Because of these skills, philosophical training is invaluable in almost any area of life. Recent graduates have been successful in software development, financial planning, journalism, teaching, and aviation. A few go on to graduate school and become professional philosophers.

Students' work is subjected to careful critical scrutiny. As a result, students benefit from philosophy courses with an increased competence in expository clarity, logical rigor, and analytical skill.

Philosophy is an excellent undergraduate major for pre-professional students. It is perhaps ideal for those who aspire to work in the legal profession. The History and Philosophy of Science major is of particular interest to those planning careers in the sciences. Courses in ethics offer students in any field the opportunity to think clearly about the normative dimensions of their career choices. Because the skills of philosophical analysis can be applied widely, philosophy is always a good complementary second degree for any major, whether it is in the physical sciences, social sciences, arts, or humanities.

* *Instructional and Research Facilities:* The Philosophy Writing Center provides a free tutoring service to any student writing a philosophical paper. The Philosophy Commons includes a computer lab for students and a small conference room that can be reserved for study groups.

* *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* *Research, Internships, and Service Learning:* The department offers internship credits for students leading its new majors seminar. Students may also arrange for internship credit with individual faculty. See adviser for details.

* *Department Scholarships:* None offered.

* *Student Organizations/Associations:* The Society for Undergraduate Philosophy Students (SUPS) is dedicated to the informal discussion of philosophical issues. Women in Philosophy encourages members of traditionally under represented groups to participate in the field.

Of Special Note: The department offers a new majors seminar for those wishing to explore the major.

Graduate Program

Graduate Program Coordinator
345 Savery, Box 353350
206-543-5855
philinfo@u.washington.edu

The Department of Philosophy offers programs of study leading to the Master of Arts and Doctor of Philosophy degrees, the M.A. program serving as the initial stage of the Ph.D. program.

The Master of Arts program option is a two-year non-thesis program which may be extended to three years depending on the outcome of the spring research papers. The student must take twelve courses in philosophy, satisfy a logic requirement, and at the end of the second year, submit three research papers for evaluation by the graduate faculty of the department. The courses and the papers must satisfy a distribution requirement. The departmental evaluation of the student's papers and course work determines whether an M.A. degree is awarded and also whether admission to the Ph.D. program is granted. The M.A. portion of the program serves as the initial stage of the Ph.D. program.

The Ph.D. program, which normally requires at least two years of study beyond the M.A., has three general requirements: (1) General Examination, (2) dissertation, and (3) Final Examination.

Master of Arts

Admission Requirements

In evaluating applications, the Department of Philosophy takes the following factors into account: the philosophical potential displayed in a sample of the applicant's written work, letters of recommendation, undergraduate record, and GRE scores.

1. Three letters of recommendation written on the recommender's departmental letterhead and addressed to the Graduate Admissions Committee (address below). Recommenders may send their letters directly to the department, or the applicant may include the letters in sealed envelopes with the other application materials.
2. A sample of the applicant's written philosophical work, normally an essay or paper (approximately 8-15 pages) written for a course in philosophy. Applicants are allowed one writing sample only.
3. Official GRE scores (verbal, quantitative, and analytic).
4. A 200-300 word statement of the applicant's reasons for doing graduate work in philosophy and his/her professional objectives.
5. A complete set of official college transcripts.

International Applicants

- * **TOEFL.** A minimum official TOEFL score of 600 (TOEFL score: 250) is required unless the applicant is a citizen of Australia, Canada, Ireland, New Zealand, or the United Kingdom, or has earned a bachelor's degree or higher in the U.S. or one of the countries listed above.
- * **TSE.** An official TSE score of 55 is required to receive departmental assistantships involving classroom duties unless the applicant is a citizen of one of the countries listed above. A degree from the U.S. or one of those countries does not exempt the applicant from this requirement.
- * **Degree Requirements.** The equivalent of a four-year U.S. bachelor's degree. This is based on the following criteria: the country's national system of education, type of institution attended, field of study, and level of studies completed. Policies at other institutions may differ.
- * **Financial Responsibility.** The University of Washington requires official certification of adequate financial support from each international applicant. The total annual cost (12 months) of study is \$47,076 in U.S. funds. (This cost is subject to change without notice.) Even if a graduate program is able to offer some funding, the applicant may need to provide a portion of these funds personally.
- * **ESL Requirements.** Policy for students for whom English is a second language: All such students must meet the Graduate School requirements for the admission of international students.
- * **Additional Requirements.** In addition, the Philosophy Department has the following admission requirements:
 - o An 8-15 page paper in English.
 - o A letter of recommendation addressing the applicant's ability to speak and write English. (This letter may count as one of the three required by all applicants.)
 - o Some students may be required to spend up to three additional quarters improving their English writing and speaking skills. Students who do not have adequate preparation in Western Philosophy may be

required to take Ancient Philosophy (PHIL 320), Modern Philosophy (PHIL 322), Contemporary Philosophy (PHIL 326), and Introduction to Symbolic Logic (PHIL 120). Graduate credit will not normally be given for these remedial courses.

Special Requirements

An undergraduate major in philosophy is recommended, although not required, for admission to the M.A. program. An applicant's philosophical potential is assessed primarily on the basis of a sample of his or her written work in philosophy and secondarily on the basis of his or her undergraduate record, Graduate Record Examination scores, and letters of recommendation.

Degree Requirements

Please Note: The Philosophy Department at the University of Washington does not offer a terminal M.A. degree.

This is a non-thesis program. There is no language requirement for the M.A. degree.

The following requirements supplement the general requirements set forth by the UW Graduate School in the General Catalog (see the Graduate School Admissions page for further information). All students, whether or not they have earned an M.A. at another institution, must complete the M.A. requirements before entering the Ph.D. program.

36 credits minimum, as follows:

- * **Logic Requirement:** As a condition for the M.A. degree, the department requires that each student receive either a grade of 3.0 or better in one of the graduate-level logic courses or a passing score on the departmental logic examination. The department offers the departmental logic exam once annually upon request. Part-time students must satisfy this requirement by the time they submit master's papers.
- * **Distribution Requirement:** Graduate courses are divided into three areas. Students must take at least three courses in each of the following three areas:
 1. Area One:
 - o Greek Philosophy -- PHIL 430 (3), PHIL 431 (3), PHIL 433 (3), PHIL 520 (5)
 - o Medieval Philosophy -- PHIL 421 (3), PHIL 434 (3), PHIL 521 (5)
 - o Modern Philosophy -- PHIL 422 (3), PHIL 436 (3), PHIL 437 (3), PHIL 438 (5), PHIL 522 (5), PHIL 525 (5)
 - o Recent Philosophy -- PHIL 425 (3), PHIL 426 (5), PHIL 439 (3), PHIL 458 (5), PHIL 469 (3), PHIL 526 (5)
 - o Indian Philosophy -- PHIL 412 (5), PHIL 413 (3), PHIL 418 (3), PHIL 586 (5), SNKRT 560 (3)
 2. Area Two:
 - o Logic and Philosophy of Mathematics -- PHIL 470 (5), PHIL 471 (5), PHIL 472 (5), PHIL 473 (5), PHIL 474 (5), PHIL 570 (5)
 - o Philosophy of Science -- PHIL 459 (5), PHIL 460 (5), PHIL 466 (5), PHIL 481 (5), PHIL 482 (5), PHIL 560 (5), PHIL 566 (5)
 - o Philosophy of Mind -- PHIL 463 (5), PHIL 464 (5), PHIL 563 (5)
 - o Philosophy of Language -- PHIL 443 (3), PHIL 444 (3), PHIL 453 (5), PHIL 479 (3), PHIL 553 (5)
 - o Epistemology -- PHIL 450 (5), PHIL 490 (5), PHIL 550 (5)
 - o Metaphysics -- PHIL 456 (5), PHIL 556, PHIL 587 (5)
 3. Area Three:
 - o Ethics -- PHIL 440 (5), PHIL 540 (5)
 - o Philosophy of Art -- PHIL 445 (5), PHIL 446 (5), PHIL 447 (3), PHIL 545 (5)
 - o Philosophy of History -- PHIL 465 (3), PHIL 565 (5)
 - o Social and Political Philosophy -- PHIL 406 (5), PHIL 410 (5), PHIL 411 (5), PHIL 414 (3), PHIL 461 (5), PHIL 510 (5), PHIL 514 (5)
 - o Philosophy of Religion -- PHIL 467 (5), PHIL 567 (5)
- * **12-Course Requirement:** Students must complete twelve graduate courses in philosophy, with a minimum grade of 3.0 in each course. At least four of these twelve courses must be seminars.
- * **Master's Papers:** At the end of their second year, in lieu of a master's thesis, students submit three papers, one in each distribution area. (Part-time students will submit their papers for evaluation upon completion of twelve courses in philosophy. A change of status from full-time to part-time student requires departmental approval.)
- * **Evaluation:** The graduate faculty of the department evaluates the students' progress on the basis of coursework in philosophy and the papers submitted. The graduate faculty then decides whether the students are (a) awarded an M.A. and admitted to the Ph.D. program; (b) awarded an M.A. and invited to submit papers a second time; (c) awarded a terminal M.A.; or (d) dropped from the program without a

degree. Students resubmitting papers must submit completely new ones that satisfy the distribution requirements. A completely new paper is one that has not been submitted before and is not a revised version of one that has been submitted before. These papers are due the following year.

- * **Satisfactory Progress:** Students not yet admitted to the Ph.D. program must have at least two courses (10 credits) per quarter with a grade of 3.0 or better in order to be in good standing. Please be aware that an excessive number of incompletes may jeopardize a student's good standing. If a student does not make satisfactory progress in a given quarter, the director of graduate studies will recommend to the dean of the Graduate School that the student be placed on probation.
- * **Other Courses:** Students may use three courses outside philosophy in determining whether they are making satisfactory progress. The courses must be approved by the director of graduate studies as part of a program of specialization. Courses in areas other than philosophy do not normally satisfy the twelve-course requirement.

Doctor of Philosophy

Admission Requirements

Admission to the Ph.D. program is based on the level of performance with the M.A. requirements. (See above.)

Degree Requirements

60 credits minimum beyond the master's degree, as follows:

- * **General Requirements:** There are four general requirements for the completion of the doctoral degree:
 1. General written examination
 2. General oral examination
 3. Dissertation
 4. Final examinationThe master's papers constitute the written portion of the general examination. The general oral examination is normally a presentation and defense of the student's dissertation proposal.
- * **Course Requirement:** The only departmental course requirement is that the student must complete a total of at least six seminars with a grade of 3.0 or better in each before being awarded the Ph.D. (seminars taken to fulfill the M.A. requirements may count toward this total). A student's supervisory committee may, however, require additional courses.
- * **Language Requirement:** There is no departmental language requirement. However, in writing a dissertation a student must be able to deal with primary sources in the original language of the source. All language requirements are determined by the student's supervisory committee. A student should develop the needed language skills as early as possible in his/her career. The student should consult with the director of graduate studies during the first and second year in the M.A. program to insure that he/she is developing any needed language skills.
- * **Satisfactory Progress:** A student's supervisory committee determines whether a student in the Ph.D. program is making satisfactory progress. Satisfactory progress for the Ph.D. program includes steady and substantial progress toward the completion of the dissertation. Sanctions for failure to make satisfactory progress are the same as described for the master's requirements.

Financial Aid

The department has some teaching assistantships available to incoming students and the Graduate School offers some non-teaching assistantships.

Course Descriptions

See page 402.

Physics

C121 Physics-Astronomy Building

Physics is the study of the fundamental structure of matter and the interaction of its constituents, with the goal of providing a quantitative description of nature based on a limited number of physical principles.

Undergraduate Program

Adviser
C139A Physics-Astronomy, Box 351560
206-543-2772

The Department of Physics offers the following programs of study:

- * The Bachelor of Science degree with a major in physics
- * A minor in physics

Bachelor of Science

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126 (or MATH 144, MATH 145, MATH 146), MATH 308, MATH 324; PHYS 121, PHYS 122, PHYS 123, PHYS 224, PHYS 225, PHYS 227, PHYS 228. (Note: MATH 134, MATH 135, and MATH 136 can be used in place of MATH 124, MATH 125, MATH 126, and MATH 308.)

These physics and mathematics courses are required prerequisites for junior-level work in physics not only at the UW but also at most colleges and universities in the United States. Students who do not complete them during the first two years in college will either need to take more than four years to earn a degree or will be limited to a minimal course of study for graduation in four years.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Minimum 86 credits as follows:

1. **Core courses (38 credits):** PHYS 121, PHYS 122, PHYS 123, PHYS 224, PHYS 225, PHYS 227, PHYS 228, PHYS 321, PHYS 322, PHYS 334.
2. **Upper-division lecture courses in modern physics (3-4 credits):** Either PHYS 315 or PHYS 324.
3. **Upper-division physics laboratory courses (6 credits):** Two courses from PHYS 331, PHYS 335, PHYS 431, PHYS 432, PHYS 433, or PHYS 434.
4. **Research and seminars (3 credits):** Choices include PHYS 401, PHYS 402, PHYS 403; or PHYS 485, PHYS 486, PHYS 487; or PHYS 491, PHYS 492, PHYS 493; or PHYS 494, PHYS 495, PHYS 496; or ASTR 480. 1-3 credits of independent research that has significant physics content in a cognate subject (astronomy, chemistry, etc.) may be substituted for 1-3 credits of the above choices with approval of the adviser.
5. **Upper-division lecture courses (6-7 credits):** Two courses from an approved list of upper-division lecture courses in physics or cognate subjects.
6. **Mathematics (21 credits):** MATH 124, MATH 125, MATH 126, MATH 324, and one from MATH 308, MATH 318, or AMATH 352.
7. **Related sciences (9 credits):** Selected from physical or biological sciences other than physics, mathematics, or computer science, or from the history or philosophy of science, in addition to any courses in these fields taken to satisfy requirement 5, above.
8. At least 12 credits of the physics courses presented to satisfy requirements 1 through 5, above, shall be in physics courses numbered 300 or above taken at the UW.
9. A minimum grade of 2.0 is required in all courses presented in fulfillment of requirements 1 through 5, above.
10. Students who plan graduate study in physics are strongly advised to complete PHYS 323, PHYS 324, PHYS 325, PHYS 328, as well as several of the following: PHYS 231, PHYS 232, PHYS 331, PHYS 421, PHYS 422, PHYS 423, PHYS 424, PHYS 425, PHYS 426, PHYS 431, PHYS 432, PHYS 433, and AMATH 401, AMATH 402, AMATH 403.

Minor

Minor Requirements: 30-36 physics credits as follows:

1. **Core courses:** PHYS 121, PHYS 122, PHYS 123, PHYS 224, and PHYS 225
2. One of the following options:
 - a. **Physics Education:** PHYS 407, PHYS 408, PHYS 409 (total 36 physics credits)
 - Experimental Physics:** PHYS 231, PHYS 334 and one course from PHYS 331, PHYS 335, PHYS 431, PHYS 432, PHYS 433, or PHYS 434 (total 30 physics credits)

- b. *Mathematical Physics*: PHYS 227, PHYS 228 (MATH 308 required), and one course from PHYS 321 or PHYS 324 (MATH 324 required) (total 30 physics credits)
- 3. Minimum grade of 2.0 required for each physics course counted toward the minor.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes*: The program is one of the largest in the nation, with approximately 70 majors graduating every year. Graduates may join the work force in a variety of technical occupations where analytical, computational, and problem-solving skills are highly valued, both in government and the private sector. They may also continue to further studies in physics, further studies in other fields (such as astronomy, medicine, law, business, biology, or engineering).
- * *Instructional and Research Facilities*: The Physics and Astronomy departments share a modern building with excellent instructional and research facilities. Undergraduate students are strongly encouraged to participate in ongoing research in the department.
- * *Honors Options Available*: With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning*: Most undergraduate physics majors participate in a research experience, either on campus or off. Research internships in physics and related departments are available for both pay and course credit. Many students participate in national programs, typically the summer after their junior year. The department also maintains an exchange program with Universitat Leibig in Geissen, Germany.
- * *Department Scholarships*: None available
- * *Student Organizations/Associations*: Society of Physics Students, www.phys.washington.edu/~sps/; Career Development Organization for Physicists and Astronomers, <http://students.washington.edu/cdophys/CAREER/>

Of Special Note:

- * One year of high school physics is strongly recommended before taking PHYS 121.
- * *Progress Requirement*: In each academic year, every undergraduate physics major who either has completed the required 200-level courses in physics or has begun physics courses beyond the 200 level must (1) complete at least 15 credits of course work acceptable in fulfillment of the departmental major requirements, exclusive of credits earned by repeating courses in which acceptable credit has been earned previously, or (2) satisfactorily complete an approved part-time program of study. Students who do not satisfy the above requirement will be dropped as physics majors unless exempted explicitly by the Physics Undergraduate Majors Committee. Students dropped for this reason may petition the committee for readmission to the major.

Graduate Program

Graduate Program Coordinator
C139 B Physics-Astronomy, Box 351560
206-543-2488

The Department of Physics offers studies leading to the degrees of Master of Science and Doctor of Philosophy. The department has a permanent faculty of 46 members, about 14 research faculty, and about 56 adjunct, affiliate, and emeritus faculty. An average of twenty Ph.D. and thirty M.S. degrees in physics have been awarded annually in recent years.

Research Facilities

The department is well equipped, both in staff and facilities, for instruction and research in a discipline that emphasizes fundamental problems in the understanding of the physical universe. Areas of research available to the Ph.D. student within the department include atomic physics, astrophysics, condensed-matter physics, elementary-particle physics, nuclear physics, and physics education. In addition, students may do research in physics with adjunct faculty members whose primary appointment is in another department such as Aeronautics and Astronautics, Astronomy, Biochemistry, Bioengineering, Chemistry, Earth and Space Sciences, Materials Science and Engineering, or Physiology and Biophysics.

Experimental work in atomic physics is concentrated on the measurement of fundamental physical properties through laser, ion trap, and radiofrequency techniques. The emphasis on fundamental measurements is continued in experiments on the gravitational force, carried out by faculty and students in atomic physics, nuclear physics, and astrophysics. Condensed-matter experiment includes research on surfaces, interfaces, nanotubes, lower-dimensional and bulk matter, with materials as diverse as high-temperature superconductors and low-temperature hydrogen monolayers. Facilities used range from synchrotron radiation and neutron sources in the U.S. and abroad to on-campus laboratories with low-temperature, high-pressure, scanning-probe microscopy, x-ray and light scattering, and surface-physics equipment.

Members of the high-energy and particle astrophysics experimental groups are heavily engaged in experiments at the European Center for Nuclear Research in Geneva, Kamiokande, KEK in Japan, and Fermilab in Illinois. Faculty and students of the nuclear physics group are involved in a broad spectrum of research including studies of neutrino properties, relativistic heavy ions, fundamental symmetries and nuclear astrophysics. Researchers use the on-campus accelerators of the Center for Experimental Physics and Astrophysics (CENPA), as well as major facilities in the U.S., Canada, and Europe.

Theorists in the department are concerned with problems in: the theories of elementary particles and quantum fields, string theory, nuclear and high-energy reactions from the very lowest to the very highest energies, phase transitions and statistical mechanics, condensed-matter physics from localization in disordered systems to electron transport in mesoscopic systems, atomic physics, general relativity, and astrophysics. The Institute for Nuclear Theory, a national facility closely associated with the department, offers a unique opportunity for students to pursue research with distinguished permanent and visiting staff. Students in physics have the opportunity to obtain a physics degree in a number of interdisciplinary and applied physics areas through research with faculty members in other departments.

Department facilities are housed in the Physics-Astronomy Building and the Center for Experimental Physics and Astrophysics (CENPA).

Master of Science (Applications of Physics)

Admission Requirements

This option is designed for students who are currently employed and whose background is in physical science, engineering, mathematics, or computer science. Admission is based on course grades in physics and related fields, adequacy of preparation in physics, and interest in areas of instruction offered in the physics department. Entering students are expected to have an undergraduate background equivalent to a B.S. degree in physical science, engineering, mathematics, or computer science. This program is a part-time program with classes offered evenings.

Degree Requirements

As part of the standard Graduate School requirements, students are expected to complete the sequence of core courses PHYS 441, 541, and 543, and to select appropriate elective courses. In addition, students must complete an independent-study project in consultation with a faculty member. This project may be carried out at the University or at the student's place of employment. A written report as well as an oral presentation of the project are required. Students must take at least 3 credits of PHYS 600 while completing the project. Students must complete a total of 36 credits of work at the 400 level or above, with at least 18 of those credits at the 500 level or above. Of the 36 credits, at least 18 credits must be from numerically graded courses. No thesis is required.

Master of Science, Doctor of Philosophy

Admission Requirements

Undergraduate preparation should include upper-division courses in mechanics; electricity and magnetism; statistical physics and thermodynamics; modern physics, including an introduction to quantum mechanics; and advanced laboratory work. Preparation in mathematics should include vector analysis, complex variables, ordinary differential equations, Fourier analysis, boundary-value problems, and special functions. Admission is determined by: the applicant's undergraduate program, undergraduate grades, Graduate Record Examination aptitude and advanced physics scores, letters of recommendation, and a statement of educational and professional objectives.

Master of Science

Degree Requirements

Students must take at least 3 credits of PHYS 600 while completing the project. Students must complete a total of 36 credits of work at the 400 level or above, with at least 18 of those credits at the 500 level or above. Of the 36 credits, at least 18 credits must be from numerically graded courses. A qualifying examination is required. No thesis is required.

Doctor of Philosophy

Degree Requirements

The student is expected to obtain here, or elsewhere with a master's degree, a background in physics equivalent to that contained in the following basic graduate courses: PHYS 505, 506, 511, 513, 514, 515, 517, 518, 519, 520, and 524; in specialized courses appropriate to each student's interests; and two advanced elective courses outside the student's area of research. The student is required to pass, successively, a written qualifying examination (typically at the beginning of the second year), an oral General Examination for admission to candidacy, and an oral Final Examination. In order to take the General Examination, the student must have been accepted by a graduate faculty member as a research student and have completed the graduate studies outlined above. This examination concentrates on the area in which the dissertation research is planned. Teaching experience is required of all candidates. Courses in teaching techniques in physics, PHYS 501-503, are required of students holding teaching assistantships.

Financial Aid

Most graduate students are supported by fellowships and assistantships. Applications for the Ph.D. program are automatically considered for these fellowships and assistantships.

Course Descriptions

See page 404.

Political Science

101 Gowen

Political science, broadly conceived, is the study of governments and other political actors, including their origins and foundations, interactions with groups and individuals, and interactions with nations. Within this larger framework political scientists study power, authority, conflict, economic relationships, culture, laws, policy, values, ethics, justice, equality, rights, legitimacy, and representation, to list only a few. Using these and other concepts, they analyze the political impacts of social issues such as war, peace, poverty, crime, education, the environment, race, gender, and globalization. Modes of inquiry are highly interdisciplinary.

Undergraduate Program

Adviser
215 Smith, Box 353530
206-543-1824
polsadvc@u.washington.edu

The Department of Political Science offers the following programs of study:

- * The Bachelor of Arts degree with a major in political science with options in political economy and political communication
- * A minor in political science

Coursework in the discipline covers four major fields of political science: American politics, comparative politics, international relations, and political theory. Students may pursue faculty-supervised independent study projects and an optional senior thesis.

Bachelor of Arts

Suggested First- and Second-Year College Courses: Courses that develop writing skills and breadth of knowledge. Introductory statistics.

Department Admission Requirements

1. Sophomore standing (completion of 45 college credits).
2. Minimum 2.00 cumulative GPA.
3. Three introductory political science courses (15 credits) with a grade of at least 2.0 in each from the following: POL S 101, POL S 201, POL S 202, POL S 203, POL S 204, POL S 205.
4. Students are admitted all quarters and there are no quarterly deadlines. Applications and additional information available from advisers in 215 Smith.

Major Requirements

50 credits in political science as follows:

1. *Introductory Requirement (15 credits):* Three courses from POL S 101, POL S 201, POL S 202, POL S 203, POL S 204, POL S 205
2. *Field Requirement (15 credits):* Three upper-division courses with a grade of at least 2.0 in each, in three different fields of political science: political theory, comparative politics, international relations, American politics, and research methods. UW political science courses that count for upper-division credit are numbered POL S 212 and above.
3. *Electives (20 credits):* 20 credits of upper-division political science course work with a grade of at least 2.0 in each
4. *GPA Requirement:* Minimum cumulative GPA of 2.25 in political science courses at graduation and a minimum grade of 2.0 in each political science course taken to fulfill requirements for the major.
5. Transfer and postbaccalaureate students must meet all the above requirements and complete a minimum of 10 upper-division political science credits at the UW.

Political Economy and Political Communication: The department also offers political economy and political communication options, specialized programs of study that combine political science and economics or political science and communications. Students who wish to pursue these interdisciplinary options should consult with a political science adviser. A list of recommended course work is available.

Minor

Minor Requirements: 30 political science credits as follows:

One introductory course (POL S 101, POL S 201, POL S 202, POL S 203, POL S 204, or POL S 205), 20 upper-division elective credits (UW political science courses that count for upper-division credit are numbered POL S 212 and above), and 5 credits at the 400-level.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The study of political science arms students with substantive knowledge of the discipline, including its concepts and theories. It also prepares them to be knowledgeable and active citizens. Through their study, students develop critical thinking, analytical, research, writing, interpersonal, and communication skills.

Graduates of political science pursue careers in many fields, including government (federal, state, and local), business, trade, public service (including non-governmental and international organizations), law, journalism, and teaching.

- * *Instructional and Research Facilities:*
 - o Political Science Collaboratory: This facility has 25 computer stations. It functions as a computer classroom and also as a general lab, primarily for political science majors and students enrolled in political science classes.
 - o Political Science Writing Center: The Writing Center is operated in conjunction with the Jackson School of International Studies and the Law, Societies, and Justice Program. The center is staffed with peer tutors who provide drop-in help for students. The Writing Center director works with instructors to design workshops to help students with assignments.
 - o The Department of Political Science is affiliated with a number of research centers:
 - o The Center for American Politics and Public Policy is a focal point for the study of politics and policy processes in the United States. Research relates to public policy processes, including issues of agenda setting, decision making, implementation, quantitative and qualitative measures of policy change, and the role of ideas and dialogue in policy change. Policy arenas include education reform,

health care, environmental regulation, and building code enforcement.

- o The Center for Communication and Civic Engagement investigates how innovative communication can improve the quality of civic life. The center's primary focus is to understand how new information technologies can supplement more traditional forms of communication to facilitate civic engagement.
 - o Harry Bridges Center for Labor Studies promotes the study of labor as a central concern in higher education and focuses on labor's contribution to society -- locally, nationally, and worldwide. The center supports research, teaching, and community outreach.
 - o European Union Center promotes the study of the European Union and trans-Atlantic relations.
 - o Center for Social Science Computation and Research maintains an extensive data archive and offers many statistical and software consulting services.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* The department offers three internship programs that range from part-time, 5-credit assignments to full-time, 15-credit programs. Students may work in local agencies (POL S 496), in the state legislature (POL S 497), and in Washington, D.C. (POL S 498).

Listings of local internships and applications are available in 215 Smith.

The Washington State Legislative Internship Program is a winter-quarter program in Olympia and is open to students from all majors. Students earn 15 credits for the internship and attend a class taught by a political science faculty member. Applications are available from departmental advisers in 215 Smith and are due by the end of October.

Students in all majors may apply for the Washington Center, a comprehensive program that places students in Washington, D.C. Students earn 15 credits for the internship. Additional information is available from departmental advisers in 215 Smith.

- * *Department Scholarships:*
- o Hugh Bone Scholarship: The endowed Hugh A. Bone Scholarship was established by the Department of Political Science in 1986 to recognize Professor Bone, a former department chair, and to continue his commitment to a "participative citizenry." Professor Bone founded the Washington State Legislative Internship Program and many of the students who studied with him continue active political lives due to his stewardship and interest. The scholarship was established in his name to help students with financial need to study and intern away from the UW-Seattle campus.
 - o Agnes C. Nelson Memorial Scholarship: The departments of Political Science and Economics make annual full-tuition awards to students who demonstrate interest in the interrelationship of politics and economics and who meet financial eligibility requirements. To apply for the scholarship, students must have completed a minimum of 25 credits in political science and economics with at least 10 credits in each discipline. Deadlines are posted early in spring quarter.
- * *Student Organizations/Associations:* Pi Sigma Alpha (Political Science Honor Society), Phi Alpha Delta (pre-law fraternity). See adviser for details

Of Special Note: Department Awards

- * The Robert A. Dahl Award: The Department of Political Science recognizes an outstanding graduating senior with the Robert A. Dahl Award. To be eligible for consideration, a student must demonstrate scholarship excellence as well as high interest in political science as a discipline.
- * Daniel C. Lev Award: The Department of Political Science created this award to recognize the contribution of Professor Dan Lev to the department's honors program. The award recognizes an exceptional Senior Honors Thesis.
- * Sharon S. Redeker Award for Public Service: The Department of Political Science created this award in honor of Sharon Redeker, who served for many years as the department's Director of Academic Services. This award recognizes the exceptional public service of a political science senior while at the University of Washington.

Graduate Program

Graduate Program Coordinator
215 Smith, Box 353530
206-543-1898
polsgrad@u.washington.edu

Graduate study in political science integrates traditional education in political science's primary fields with other fields in the social sciences, allowing an eclectic, interdisciplinary approach.

The department has an outstanding reputation in comparative politics, international relations, American politics, political theory, international relations, political economy, public policy, public law, political communication, and methodology. Graduate students can incorporate study in other campus units, such as the School of Marine Affairs, the Daniel J. Evans School of Public Affairs, the Henry M. Jackson School of International Studies, and the Department of Communication.

Graduate work in political science is primarily for preparation for the Doctor of Philosophy degree. The Master of Arts program serves as the initial stage of the Ph.D. program; the department does not offer a terminal Master of Arts degree.

Master of Arts

Admission Requirements

- * Statement of Purpose containing academic background, including any research experience and methodological skills; plans and goals for study, including intellectual interests and areas of specialization; and reasons for interest in studying at the University of Washington.
- * *Writing sample:* A relatively short paper (not to exceed 20 pages) or excerpts from a larger work (e.g., honors thesis) demonstrating ability to write critically and analytically.
- * Resume
- * Letters of recommendation
- * Transcripts
- * *Test scores:* GRE General Test scores sent directly by the Educational Testing Service (ETS). TOEFL score of 580 (237 for the computer-based TOEFL) for international students, sent directly by the Educational Testing Service (ETS)-

Degree Requirements

The department recognizes four "general fields" in political science: American politics, comparative politics, international relations, and political theory. The department requires each student to select one general field, in which the student must become familiar with the main body of literature, major intellectual issues and develop competence in that field's mode of analysis. To meet this requirement, students must take the core course in the designated field. All students are required to take at least one additional core course in another general field.

For the master's degree, a student must also prepare in a second general field or in one of the specialized fields: area study (i.e., Southeast Asian or Western European politics), public law, political economy, public policy processes, and political culture. Specialized fields are periodically redefined given faculty/student interests.

All graduate students are required to achieve a minimum level of competence in political research methods. During their first year, M.A. students complete POL S 490-491. Students who intend to pursue the Ph.D. are expected to continue this series during the second year of their program, with a third course to be taken in political science or another field of the social sciences from a recommended list provided by the department. Demonstration of competence in a foreign language is not required for either the M.A. or Ph.D. Should the student select a field(s) where the supervisory committee believes that competence in a language would be beneficial, (s)he will be so advised.

Students entering the master's program are expected to complete the degree (46 credits minimum) within two years. The M.A. student will complete an Essay of Distinction and a final oral examination, to demonstrate substantive field knowledge and the ability to synthesize and apply that knowledge to new problems.

Doctor of Philosophy

Admission Requirements

- * Statement of Purpose containing academic background, including any research experience and methodological skills; plans and goals for study, including intellectual interests and areas of specialization; and reasons for interest in studying at the University of Washington.
- * *Writing sample:* A relatively short paper (not to exceed 20 pages) or excerpts from a larger work (e.g., honors thesis) demonstrating ability to write critically and analytically.
- * Resume
- * Letters of recommendation
- * Transcripts
- * *Test scores:* GRE General Test scores sent directly by the Educational Testing Service (ETS). TOEFL score of 580 (237 for the computer-based TOEFL) for international students, sent directly by the Educational Testing Service (ETS)-

Degree Requirements

The department recognizes four "general fields" in political science: American politics, comparative politics, international relations, and political theory. The department requires each student to select one general field, in which the student must become familiar with the main body of literature, major intellectual issues and develop competence in that field's mode of analysis. To meet this requirement, students must take the core course in the designated field. All students are required to take at least one additional core course in another general field.

The doctoral student must prepare in a total of three fields--a second general field and/or one or more of the specialized fields (area study (i.e., Southeast Asian or Western European politics), public law, political economy, public policy processes, and political culture), and/or at most one non-designated field. A non-designated field is constructed from another academic discipline such as anthropology or sociology, or individually defined by the student. Political methodology, international law, public administration, urban politics, political psychology, ethnicity and nationality, philosophy of social science, and language policy are examples of recent non-designated fields.

All graduate students are required to achieve a minimum level of competence in political research methods. During their first year, both M.A. and Ph.D. students complete POL S 490-491. Ph.D. are expected to continue this series during the second year of their program, with a third course to be taken in political science or another field of the social sciences from a recommended list provided by the department. Demonstration of competence in a foreign language is not required for the Ph.D. Should the student select a field(s) where the supervisory committee believes that competence in a language would be beneficial, (s)he will be so advised.

The doctorate usually takes an additional three years beyond the M.A. (124 credits minimum, including at least 27 credits for the dissertation). Students must pass comprehensive written and oral examinations in each of the three fields, called the General Examination, and complete the Ph.C. Essay of Distinction. Successful completion of the General Examination constitutes advancement to candidacy for the doctoral student. A candidate then prepares a dissertation proposal for faculty review; approval leads to the research and writing of the dissertation. A final oral examination and committee approval of the doctoral dissertation complete the degree requirements.

Research Facilities

Access to computing facilities and extensive data holdings is available through the Center for Social Science Computation and Research and the Political Science Collaboratory. The Department of Political Science is also affiliated with several research centers, including the Center for American Politics and Public Policy, the Center for Communication and Civic Engagement, the Center for Statistics and the Social Sciences, the Comparative Law and Society Studies Center, the Harry Bridges Labor Studies Center, and the Center for Comparative and Historical Analysis of Organizations and States. The University is also a member of the Inter-University Consortium for Political and Social Research.

Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of

study. Provided they make satisfactory progress, students are eligible for departmental financial assistance for five consecutive years.

Course Descriptions

See page 408.

Psychology

119 Guthrie

Psychology involves the scientific study of behavior and its causes and the understanding of human and animal behavior in a variety of settings. Psychology is studied both as a natural science, which stresses physical and biological causes of behavior, and as a social science, which stresses the effects of the social setting on human and animal behavior. Major areas of emphasis are human cognition and perception, animal behavior, behavioral neuroscience, developmental, social and personality, and clinical psychology.

Undergraduate Program

Adviser
119 Guthrie, Box 351525
206-543-2698
psyadvis@u.washington.edu

The Department of Psychology offers the following programs of study:

- * The Bachelor of Science degree with a major in psychology
- * The Bachelor of Arts degree with a major in psychology

The Bachelor of Science program prepares students for doctoral programs in psychology, leading to careers in teaching, research, or clinical psychology. The program emphasizes laboratory/research experience and statistics.

The Bachelor of Arts program provides a general background in psychology for students preparing for master's-level graduate programs or professional schools, seeking employment at the baccalaureate level, or wanting to apply the principles of psychology in other disciplines.

The department does not have formal programs in educational, school, or counseling psychology; engineering psychology; or industrial psychology.

Bachelor of Science

Suggested First-Year College Courses: MATH 120 and MATH 124, or MATH 120 and MATH 144. (MATH 120 and MATH 144 is the recommended sequence.) PSYCH 101. Any sociology or anthropology course. Students are encouraged to begin completion of general education requirements.

Suggested Second-Year College Courses: PSYCH 202 and 209 should be completed as soon as possible during this year; BIOL 118, BIOL 161-BIOL 162, BIOL 180, BIOL 200, or BIOL 220. Students intending to take animal behavior courses in the Psychology Department should plan to fulfill the biology requirement with either BIOL 161-BIOL 162, BIOL 180, or BIOL 200. Continue working toward completion of general education requirements, including foreign language. The foreign language requirement should, ideally, be completed within the first two years of college.

Department Admission Requirements

Students apply to the Department of Psychology under the same admission requirements, regardless of the degree they will pursue.

1. Minimum cumulative UW GPA of 2.00.
2. Completion of one of the following math courses with a minimum grade of 2.0: MATH 111, MATH 112, MATH 120, MATH 124, or MATH 144. (Students may fulfill this requirement with test scores that place them in MATH 112 or MATH 124 or higher.)
3. Completion of the following psychology courses with a minimum grade of 2.0 in each course and a cumulative GPA of 2.50 in the three courses: PSYCH 101, PSYCH 202, and PSYCH 209.
4. Admission is competitive based on the following criteria:

- Preparation for a major in psychology as indicated by the grades earned in courses required for admission
 - GPA, with an emphasis on grades earned in psychology courses
 - Other evidence of a commitment to becoming a psychology major
 - Personal statement reflecting an interest in and commitment to becoming a psychology major
 - Copies of unofficial transcripts from all schools attended (UW and transfer).
- Meeting the above criteria does not guarantee admission to the department.
- The application deadline is the first Friday of autumn, winter, and spring quarters; no applications are accepted summer quarter. Applications and additional information are available in 119A Guthrie.

Major Requirements

84-86 credits as follows:

- PSYCH 101, PSYCH 202, PSYCH 209 (with a grade of 2.5 or higher), PSYCH 317 and PSYCH 318
- One lab course from PSYCH 330, PSYCH 331, PSYCH 332, PSYCH 361, PSYCH 417, PSYCH 418, or PSYCH 419
- One course from PSYCH 300, PSYCH 333, or PSYCH 355
- One course from PSYCH 303, PSYCH 305, PSYCH 306, or PSYCH 345
- One additional course from PSYCH 300, PSYCH 303, PSYCH 305, PSYCH 306, PSYCH 333, PSYCH 345, or PSYCH 355
- Three additional graded upper-division classes with at least one at the 400 level (cannot include PSYCH 491 through PSYCH 499)
- PSYCH 499 (3 credits)
- PSYCH 496, PSYCH 497, or PSYCH 498 (3 credits) or 3 additional credits of PSYCH 499
- Up to 6 credits in 200- to 400-level electives to make a minimum total of 66 psychology credits
- Students may not use PSYCH 200 as an elective if PSYCH 300 is used to fulfill major requirements; or use PSYCH 203 as an elective if PSYCH 303 is used to fulfill major requirements; or use PSYCH 206 as an elective if PSYCH 306 is used to fulfill major requirements; or use PSYCH 245 as an elective if PSYCH 345 is used to fulfill major requirements.
- Courses in related fields:
 - One of the following MATH sequences: MATH 120 and 124, or MATH 120 and MATH 144 (MATH 120 and MATH 144 preferred). Students may satisfy this requirement by testing out of MATH 124 or MATH 144
 - One biological science course from BIOL 118, BIOL 161-BIOL 162, BIOL 180, BIOL 200, or BIOL 220
 - One of the following philosophy courses: PHIL 120, PHIL 160
 - One social science course (3 to 5 credits) from anthropology or sociology
- Cumulative minimum GPA of 2.50 in all PSYCH courses applied toward the degree (UW and transfer), with a minimum grade of 2.0 in each course presented for the major. Note that a grade of 2.5 or higher is required in PSYCH 209 in order for students to progress to the PSYCH 317/PSYCH 318 statistics series.
- Transfer students must meet all of the above requirements and are required to complete at least 15 graded credits in psychology at the 300 and 400 level at the UW.

Bachelor of Arts

Suggested First-Year College Courses: MATH 111, MATH 112, MATH 120, MATH 124, or MATH 144. PSYCH 101. Any sociology or anthropology course. Students are encouraged to begin completion of general education requirements.

Suggested Second-Year College Courses: PSYCH 202 and 209 should be completed as soon as possible during this year. BIOL 118, BIOL 161-BIOL 162, BIOL 180, BIOL 200, or BIOL 220. Students intending to take animal behavior courses in the Psychology department should plan to fulfill the biology requirement with either BIOL 161-BIOL 162, BIOL 180, or BIOL 200. Continue working toward completion of general education requirements, including foreign language. The foreign language requirement should, ideally, be completed within the first two years of college.

Major Requirements

66 to 68 credits as follows:

- PSYCH 101, PSYCH 202, PSYCH 209, PSYCH 315 (or PSYCH 317 and PSYCH 318)

- One lab course from PSYCH 330, PSYCH 331, PSYCH 332, PSYCH 361, PSYCH 417, PSYCH 418, or PSYCH 419
- One course from PSYCH 300, PSYCH 333, or PSYCH 355
- One course from PSYCH 303, PSYCH 305, PSYCH 306, or PSYCH 345
- One additional course from PSYCH 300, PSYCH 303, PSYCH 305, PSYCH 306, PSYCH 333, PSYCH 345, or PSYCH 355
- Two additional graded upper division classes with at least one at the 400 level (cannot include PSYCH 491 through PSYCH 499)
- 3 credits from the following list: PSYCH 494, PSYCH 496, PSYCH 497, PSYCH 498, PSYCH 499; or credit from an approved study abroad program
- Up to 4 credits of PSYCH 200- to 400-level electives to make a minimum total of 53 psychology credits
- Students may not use PSYCH 200 as an elective if PSYCH 300 is used to fulfill major requirements; or use PSYCH 203 as an elective if PSYCH 303 is used to fulfill major requirements; or use PSYCH 206 as an elective if PSYCH 306 is used to fulfill major requirements; or use PSYCH 245 as an elective if PSYCH 345 is used to fulfill major requirements.
- Courses in related fields:
 - One MATH course from MATH 111, MATH 112, MATH 120, MATH 124, or MATH 144. Students may satisfy this requirement by testing out of any of the specified classes.
 - One biological science course from BIOL 118, BIOL 161-BIOL 162, BIOL 180, BIOL 200, or BIOL 220
 - One social science course (3 to 5 credits) from anthropology or sociology
- Cumulative minimum GPA of 2.50 in all psychology courses applied toward the degree (UW and transfer), with a minimum grade of 2.0 in each course presented for the major
- Transfer students must meet all the above requirements and must to complete at least 15 graded credits in psychology at the 300 and 400 level at the UW.

Student Outcomes and Opportunities

- Learning Objectives and Expected Outcomes:* Students understand and apply scientific methods and principles, receive an excellent preparation in the theoretical explanations of human and animal behavior, and understand the introductory concepts underlying the biological basis of behavior.
- Instructional and Research Facilities:* The psychology faculty have extensive research facilities and research laboratories on the UW campus and nearby buildings.
- Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- Research, Internships, and Service Learning:* The Department of Psychology offers academic credit for approved field work experience. The advising office maintains internship listings which are updated regularly.
- Department Scholarships:* None offered.
- Student Organizations/Associations:* Psi Chi (national honors society for undergraduate psychology students).

Of Special Note: A student may earn either a Bachelor of Science or a Bachelor of Arts degree in psychology, but not both.

Graduate Program

Graduate Program Coordinator
306 Guthrie, Box 351525
206-543-2563
psygrad@u.washington.edu

Graduate work in psychology is organized primarily as preparation for the Doctor of Philosophy degree. The optional Master of Science degree is taken by some doctoral students in the course of their work toward the doctorate.

For graduate instruction, the department is organized into six major areas of study: animal behavior, adult and child clinical, cognition and perception, developmental, physiological, and social psychology and personality. Specialization groups also exist in the sub-areas of diversity and self-regulation, and in community, sport, and quantitative psychology.

The program in clinical psychology is accredited by the American Psychological Association and provides scientific and professional training.

Master of Science (Optional)

A master's-degree-only program is not available. Doctoral students have the option of obtaining a master's degree while working toward the Ph.D.

Degree Requirements

Completion of first-year graduate program (see Doctor of Philosophy degree requirements below) and an appropriate research program, including a research thesis.

Doctor of Philosophy

Admission Requirements

An undergraduate degree in psychology is desirable, but not required. Some preparation in biological, social, or quantitative sciences is strongly advised. Applicants are judged on a number of criteria, including academic and research backgrounds, Graduate Record Examination scores, and written evaluations submitted by former professors or supervisors. Admission of new students occurs in autumn quarter. The deadline for receipt of admissions material is December 15.

Degree Requirements

Minimum 90 credits, as follows:

- * *Coursework:*
 - o Orientation Week: PSYCH 500 (1)
 - o Psychology Colloquium: PSYCH 500 (1)
 - o Statistics and General Methodology: During the first year, students must complete each of the following with a minimum grade of 2.7: PSYCH 522 (2), PSYCH 523 (2), PSYCH 524 (4), PSYCH 525 (4).
 - o Area Course Requirements: All students are required to take a set of six or more courses as required by the individual areas (see below)
 - o Seminars and Advanced Seminars: All students are strongly encouraged to attend a seminar as specified by their area (see below), and to attend the departmental colloquium (PSYCH 550).
 - o Substitutions: Potential substitutions should be discussed with the student's adviser and Area Head or Area Representative.
- * *Area Requirements:*
 - o Animal Behavior:
 - + Core courses: PSYCH 502 (3), PSYCH 503 (4), PSYCH 562 (3)
 - + Three additional courses chosen in consultation with adviser. The following courses may be particularly appropriate for Animal Behavior students: PSYCH 504 (3), PSYCH 505 (4), PSYCH 513 (4)
 - + All Animal Behavior students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their Area, throughout their graduate careers.
 - o Adult Clinical Area:
 - + Core courses: PSYCH 517 (3), PSYCH 518 (5), PSYCH 519 (5), PSYCH 511 (3) (PSYCH 594 (5) may be substituted), PSYCH 515 (4) (PSYCH 571 (5) or PSYCH 572 (4) may be substituted)
 - + Six additional out-of-area courses. These six courses must meet the APA curriculum guidelines for "breadth of scientific psychology," covering biological, affective-cognitive, and social aspects of behavior as determined by mutual agreement between the student and adviser. Courses should be selected toward developing cohesive themes of subspecialty expertise pertinent to the student's future research and clinical endeavors.
 - + One course each in social, affective/cognitive, and biological psychology is required. Core concepts courses that can be used to meet the APA breadth requirements are as follows: Affective-Cognitive Breadth: PSYCH 507 (3); Social Breadth: PSYCH 510 (4); Biological Breadth: PSYCH 502 (3), PSYCH 503 (4), PSYCH 504 (3), PSYCH 506 (3)
 - + NOTE: PSYCH 594, PSYCH 571 and PSYCH 572 cannot be used as out-of-area courses.
 - + One course in community psychology of minority mental health: PSYCH 574 (4), PSYCH 580 (3), or other approved courses.
 - + Three courses in clinical issues and methods: PSYCH 591 (1, max. 3), PSYCH 587 (2), PSYCH 588 (2)
 - + Two courses in assessment: PSYCH 586 (3); one of the following three courses: PSYCH 576 with PSYCH 590 practicum (5/2), PSYCH 578 with PSYCH 590 (4/2), PSYCH 579 (4)
 - + Clinical practica on a continuing basis: PSYCH 589 (4), PSYCH

593 (1-6, max. 24), PSYCH 597 (1-5, max. 36)

- + Seminars and advanced seminars: PSYCH 550 (1-2, max. 30)
 - + All clinical students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their Area, throughout their graduate careers.
 - + Other requirements for clinical students: A one-year predoctoral internship
- o Behavioral Neuroscience:
 - + Core courses: PSYCH 421 (5), PSYCH 504 (3), NEUBEH 502 (4); two of the following three courses: NEUBEH 501 (3), NEUBEH 503 (4), CONJ 531/CONJ 532 (1.5/1.5)
 - + Three additional psychology courses: PSYCH 565 (3); not more than one of the following: PSYCH 423 (5), PSYCH 424 (5), PSYCH 426 (4), PSYCH 427 (5), PSYCH 430 (4); one or more of the following: PSYCH 502 (3), PSYCH 503 (4), PSYCH 506 (3), PSYCH 513 (4)
 - + Seminars and advanced seminars: All BNS students are required to take at least three quarters of PSYCH 522 (2). In addition, all BNS students are required to take at least one advanced seminar (usually PSYCH 542), chosen in consultation with the student's adviser.
 - + All Behavioral Neuroscience students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their area, throughout their graduate careers.
 - o Child Clinical Area:
 - + Research methods: PSYCH 529 (5), PSYCH 531 (4)
 - + Four courses in child clinical psychology: PSYCH 571 (5), PSYCH 572 (4), PSYCH 576 with PSYCH 590 practicum (5/2), PSYCH 573 (5)
 - + Four core concepts courses: PSYCH 513 (4), PSYCH 514 (4), PSYCH 515 (4), PSYCH 517 (3)
 - + One course in minority mental health: PSYCH 580 (3)
 - + Three courses in clinical issues and methods: PSYCH 591 (1, max. 3), PSYCH 587 (2), PSYCH 588 (2)
 - + Clinical practica on a continuing basis: PSYCH 589 (4), PSYCH 593 (1-6, max. 24), PSYCH 597 (1-5, max. 36)
 - + One treatment seminar: PSYCH 543 (3-5, max. 30), PSYCH 553 (1-2, max. 30), PSYCH 550 (1-2, max. 30)
 - + All Child Clinical students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their Area, throughout their graduate careers.
 - + Other requirements for Child Clinical students: A one-year predoctoral internship
 - o Cognition and Perception:
 - + Core courses: PSYCH 506 (3), PSYCH 507 (3), PSYCH 508 (3)
 - + Three additional courses, selected to broaden and deepen the student's understanding of his/her research specialty. These courses should be chosen in consultation with the adviser. They can be additional core concepts courses in any area, or other courses chosen from anywhere on campus, within or outside the Psychology Department.
 - + The following out-of-area core concepts courses may be particularly appropriate for cognition: PSYCH 504 (3), PSYCH 510 (4), PSYCH 514 (4), PSYCH 515 (4)
 - + Seminars and advanced seminars: PSYCH 555 (1-2, max. 30)
 - + All Cognition/Perception students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their Area, throughout their graduate careers.
 - o Developmental Psychology:
 - + Research Methods: PSYCH 529 (5)
 - + Area course requirements. PSYCH 513 (4), PSYCH 514 (4), PSYCH 515 (4)
 - + Three additional courses, selected to broaden and deepen the student's understanding of his/her research specialty. These courses should be chosen in consultation with the adviser. They can be additional core concepts courses in any area, or other courses chosen from anywhere on campus, within or outside the Psychology Department.
 - + The following out-of-area core concepts courses may be particularly appropriate for Developmental students, depending on the student's research specialty: PSYCH 503 (4), PSYCH 504 (3), PSYCH 507 (3), PSYCH 510 (4), PSYCH 511 (3)
 - + In lieu of a core concepts course in Child Clinical Psychology, PSYCH 553, Seminar in Child Clinical Psychology, is also recommended for Developmental graduate students.
 - + Seminars and advanced seminars: PSYCH 556 (1-2, max. 30)
 - + All Developmental students are strongly encouraged to participate in additional seminars and advanced seminars, both within and

outside their Area, throughout their graduate careers.

- o Social Psychology and Personality:
 - + In addition to the four statistical courses required by the department, Social/Personality students are required to take one additional quantitative course, within or outside the department.
 - + Core courses: PSYCH 510 (4), PSYCH 511 (3)
 - + Four additional courses, selected to broaden and deepen the student's understanding of his/her research specialty. These courses should be chosen in consultation with the adviser. They can be additional core concepts courses in any Area, or other courses chosen from anywhere on campus, within or outside the Psychology Department.
 - + Seminars and advanced seminars: PSYCH 557 (1-2, max. 30), one additional departmental seminar (PSYCH 550 through PSYCH 558) every quarter throughout the student's graduate career
 - + All Social/Personality students are strongly encouraged to participate in additional seminars and advanced seminars, both within and outside their Area, throughout their graduate careers.

Assistantships, Fellowships, or Traineeship Opportunities

Research and teaching assistantships are generally available. Traineeships and fellowships are also available.

Course Descriptions

See page 417.

Romance Languages and Literature

C104 Padelford

The department consists of two divisions: French and Italian Studies and Spanish and Portuguese Studies. The divisions offer programs designed to develop competence in the reading, speaking, and writing of the languages and in the study of the literatures and cultures.

French and Italian Studies

C254 Padelford

Undergraduate Program

Adviser
C252 Padelford, Box 354361
206-616-5366

The Division of French and Italian Studies offers the following programs of study:

- * The Bachelor of Arts degree with a major in French or Italian
- * Minors in French and Italian

Bachelor of Arts

Suggested First- and Second-Year College Courses: Community college students should take as many lower-division language courses as possible before transferring to the UW.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

French: 60 credits beyond FRENCH 203, to include FRENCH 301, FRENCH 302, FRENCH 303, FRENCH 304, FRENCH 305, FRENCH 306, FRENCH 378. Three 400-level courses and two 300- or 400-level courses chosen to satisfy the requirements for an emphasis on literature/culture. Transfer credits at the 400 level are accepted only by petition to the Faculty Studies Committee.

Italian: 60 credits in courses at the 300 and 400 levels, including ITAL 301, ITAL 302, ITAL 303; two from ITAL 341, ITAL 342, ITAL 351, ITAL 352; ITAL 401 (or ITAL 470); ITAL 402 (or ITAL 403); and ITAL 404 (or ITAL 405); 20 additional credits in literature/culture/film courses at the 300 or 400 level, with at least 10 of these credits at the 400 level. Prerequisite for all 300-level courses is ITAL 203 or approved equivalent. A minimum 2.0 grade is required in any course applied toward the major.

Minor

Minor Requirements: French -- 30 credits including FRENCH 301, FRENCH 302, FRENCH 303, FRENCH 304 (or FRENCH 305), FRENCH 306 (or a 400-level course, with permission of instructor), FRENCH 378. Up to five credits taken abroad may be counted toward the minor.
Minor Requirements: Italian -- 30 credits in courses at the 300 and 400 levels, including ITAL 301, ITAL 302, ITAL 303, ITAL 401, ITAL 402 (or ITAL 403), and ITAL 404 (or ITAL 405), (or equivalent 400-level courses).

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Employment related to foreign languages is sometimes in specialized fields, but in general could be in many areas. The combination of studies in foreign languages and international affairs is ideal for students seeking job opportunities in government (foreign service and diplomatic fields, intelligence agencies, immigration and customs, Department of Labor, law enforcement, armed forces, legal agencies, public aid, social and community work, and international agencies, such as the United Nations and UNICEF), business (airlines, marketing, banking/finance, multi-national corporations, shipping industry, travel and hotel industries, import/export firms, publishing houses, and consulting) and related fields (journalism, radio and television, fashion enterprises, teaching/counseling, translation, bilingual office work, library/museum work, nursing, phone companies, art and cultural affairs, and film and theatrical industries).

Students with substantial foreign language fluency who combine their language skills with a solid foundation in liberal education and adequate job preparation and internships find fulfilling occupations. The department's commitment is to impart to our students a genuine desire to learn throughout their lives, a flexibility that lends itself to changes, and a seriousness of purpose to apply to whatever they undertake in life.

* *Instructional and Research Facilities:* UW Rome Center in Rome, Italy.

* *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* *Research, Internships, and Service Learning:* Rome Center offers one intern position per year, providing room and board and a modest stipend. Interns work in the administrative Rome/UW office and are required to follow an independent course of language and literature study or other proposed course of study.

* *Department Scholarships:* None available.

* *Student Organizations/Associations:* Italian Club.

Of Special Note: The department sponsors study-abroad programs in France and Italy. See adviser for details.

Graduate Program

Graduate Program Coordinator
C259 Padelford, Box 354360
206-616-5366

The Division of French and Italian Studies offers programs of graduate study leading to the degrees of Master of Arts in French or Italian and Doctor of Philosophy in French. Students who wish to complete their doctoral studies in Italian may do so through the Department of Comparative Literature.

Master of Arts in French Studies

Admission Requirements

Applicants for a Master of Arts in French should present an undergraduate major or its equivalent in French literature and culture. Preparation should be equivalent to the requirements for the Bachelor of Arts degree in French

at the University of Washington. All applicants must prove proficiency in the speaking and writing of the French language.

Before their enrollment in French Studies, all incoming M.A. students must complete a list of period and critical readings.

Degree Requirements

55 credits, as follows:

A total of 45 applicable credits (400-level and above) are required in course work, and an additional 10 credits in French 600 are given for exam preparation. 15 credits of the coursework must be taken at the 500 level (courses limited to graduate students). 5 coursework credits are given for the required pedagogy methods seminar for first-time TAs. In order to remain in good standing the student must maintain a cumulative grade-point average of 3.60. The minimum acceptable grade for any given course is 2.7.

Students must fulfill four of the department's seven period distributions. In addition, they must take one class in the History of Criticism / Critical Theory rubric.

Students are encouraged to take courses (up to 15 credits) in disciplines other than their major field of study. These credits must be approved by the Graduate Program Coordinator at the time of registration. Credits in such supporting or related fields are allowed only for courses numbered 400 or above.

The M.A. examinations (written and oral) are to be taken in the sixth quarter of study.

Master of Arts in Italian Studies

Admission Requirements

Applicants for a Master of Arts in Italian should present an undergraduate major or its equivalent in Italian literature and culture. Preparation should be equivalent to the requirements for the Bachelor of Arts degree in Italian at the University of Washington. All applicants must prove proficiency in the speaking and writing of Italian language.

- * Application for Graduate Admission, along with supporting documents
- * Three letters of recommendation
- * Autobiographical statement
- * CD or audio cassette recording of the applicant reading the autobiographical statement mentioned above, together with any other informal comments the applicant wishes to make.
- * Writing sample
- * Graduate Record Examination (GRE) scores.
- * Foreign students should note that the Graduate School requires proof of proficiency in the English language in the form of the TOEFL (Test of English as a Foreign Language) or its computerized version (TOEFLC) or the Michigan Test and also the TSE (Test of Spoken English). A TOEFL score of 500 (or a TOEFLC score of 173) is required for admission, and a score of 580 (or 237 on the computerized form) is required for Teaching Assistant eligibility. Alternatively a Michigan Test score of 80 is required for admission and 90 for Teaching Assistantship eligibility. A minimum score of 55 is required on the TSE.

Degree Requirements

A total of 50 applicable credits (400-level and above) are required in coursework, 30 of which must be taken at the 500 level (courses limited to graduate students). An additional 10 credits in ITAL 600 is required for exam preparation. To remain in good standing the student must maintain a cumulative grade-point average of 3.60. The minimum acceptable grade for any given course is 2.7.

Students are encouraged to take up to 10 credits in disciplines other than their major field of study. Credits in such supporting or related fields are allowed only for courses numbered 400 or above.

M.A. candidates must pass a foreign language reading ability examination in a language other than the major or their native language. Students stipulate their choice at the time of first enrollment, after consultation with the Graduate Adviser.

The Graduate Program Coordinator, in consultation with the student and appropriate faculty members, appoints a committee of three Italian and

Italian adjunct faculty members. The supervisory committee should be formed no later than the first week of the quarter prior to the examination.

The M.A. examinations (written and oral) are to be taken in the final quarter of study.

Doctor of Philosophy in French Studies

Admission Requirements

Applicants for the doctorate in French studies are normally required to present the M.A. degree in French or to demonstrate its equivalent for admission into the Ph.D. program. Students with a background in comparative literature or with a specialization in French within another national literature and language program will be admitted to the Ph.D. program on a case-by-case basis. All incoming doctoral students must have demonstrable, broad knowledge in French literature and culture as well as a general background in critical theory (i.e. course work in critical theory and/or course work that incorporates a strong component of critical theory).

Degree Requirements

The program demands a total of 77 credits (beyond the 45 required for the French Studies' M.A.), of which 25 should be taken in applicable 500-level courses (graduate seminars both inside and outside the division) and 27 as dissertation credits (FRENCH 800). The other 25 credits of 400-level and above courses should be chosen in collaboration with the Graduate Program Coordinator. 10 of these credits can be 600-level independent studies. Doctoral students work closely with the Graduate Program Coordinator in the selection of graduate seminars within French studies and of courses outside French studies that correspond to the students' cross-disciplinary interests. The doctoral coursework should normally be completed in six full-time academic quarters, after which the doctoral student advances to Ph.D. candidate status and completes the minimum 27 hours of dissertation credits. Upon completion of the requisite course credits and the other departmental requirements, the student proceeds, with the approval of the Doctoral Supervisory Committee, to the written general examinations and then to the oral general examinations.

Financial Aid

The department awards annually a number of teaching assistantships. Research assistantships are available on a limited and competitive basis. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the 10 weeks of the quarter.

Course Descriptions

See page 423.

Spanish and Portuguese Studies

C104 Padelford

The educational philosophy of Spanish and Portuguese studies is that knowledge and understanding of other cultures is fundamental in an increasingly global world, and that competence in the languages of those cultures is an indispensable gateway to them. Spanish studies provides students with the four basic language skills (listening, speaking, reading, and writing) in increasing levels of sophistication so that they may read and analyze works of literature written in Spanish as well as understand complex cultural structures and artifacts from Spain, Latin America, and the Latino populations of the U.S. The UW offers beginning and intermediate Portuguese and all levels of Spanish.

Undergraduate Program

Adviser
C104F Padelford, Box 354360
206-543-2075
spanport@u.washington.edu

The Division of Spanish and Portuguese Studies offers the following programs of study:

- * The Bachelor of Arts degree in with a major in Spanish
- * A minor in Spanish

Bachelor of Arts

Suggested First- and Second-Year College Courses: SPAN 101, SPAN 102, SPAN 103, or SPAN 121, SPAN 122, SPAN 123, or SPAN 134; SPAN 201, SPAN 202, SPAN 203. Spanish, Latin American, and Chicano literature. Courses related to history and culture. Courses in English literature and comparative literature.

Department Admission Requirements

1. Completion of SPAN 203, with a minimum cumulative GPA of 2.70 for all Spanish course work completed and a minimum grade of 2.5 in each Spanish course.
2. Completion of at least 10 credits of English composition with a minimum grade of 2.5 in each course. The student may apply while concurrently enrolled in the second English composition course.
3. Admission is competitive, based on the following minimum qualifications:
 - a. Preparation for the major as indicated by a student's grades in courses required for application
 - b. Overall scholastic record
 - c. Personal statement, in Spanish, of interest in and commitment to the major. Other evidence reflecting the student's interest may be appended.
 - d. Completion of the above requirements does not guarantee admission.
4. Application deadline is the first Friday of autumn, winter, and spring quarters, for admission in the fifth week of the same quarter. Applicants denied admission may submit written petitions requesting reconsideration. Applications are available in C104F Padelford.

Major Requirements

59 credits beyond SPAN 203 as follows:

1. SPAN301, SPAN 302, SPAN 303, SPAN 321, SPAN 322, SPAN 323
2. Three 300-level elective courses (maximum of two from film series)
3. Four 400-level courses (one from SPAN 400 through SPAN 409).
4. Other than SPAN 400 through SPAN 409, only one course whose instructional materials are primarily in English may apply toward the major.

Minor

Minor Requirements: Minimum 32 credits above the 203 level as follows:

1. SPAN 301, SPAN 302, SPAN 303
2. Five courses numbered SPAN 304 to SPAN 495, including at least 5 credits from SPAN 400 to SPAN 409.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The study of Spanish and Portuguese is both skills- and content-based, i.e., it has practical and cognitive elements. Students learn to communicate in Spanish or Portuguese, refining their language skills as they acquire a body of knowledge about the literary and cultural history of Spain, Latin America, and the Spanish-speaking populations of the United States. Graduates have found these skills extremely useful as they pursue careers in teaching, business, NGOs and human rights organizations, law, and politics.
- * *Instructional and Research Facilities:* Departmental facilities include a Writing Center for students registered in third-year Spanish. The Center for Spanish Studies, housed in the department, is a joint initiative of the University of Washington, the Education Office of the Embassy of Spain, and the Office of Superintendent of Public Instruction. This center provides services that include workshops for K-12 teachers of Spanish, sponsorship of cultural events, and a lending library of books as well as audio and visual materials.

The department directs two study abroad programs, in Mexico (Oaxaca) and Spain (Cadiz). These programs are "living laboratories." Approximately 75 students participate each year.

- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

- * *Research, Internships, and Service Learning:* Internship opportunities are posted on the department Web site as they become available. Also, students may participate in service learning, in which they combine study with service to the community. Students must volunteer two to five hours per week (a minimum of 20 hours per quarter) in organizations that provide services primarily, although not exclusively, to Spanish speakers. Alternatively, they may volunteer in public schools as tutors of different academic themes. Some of the organizations and schools involved include CASA Latina, The Mexican Consulate, El Centro de la Raza, Our Lady of Mt. Carmel, Northwest Immigrant Rights Project, Cascade People's Center, Center for Spanish Studies, John Stanford International School, Bryant Elementary School, John Hay Elementary School, Hamilton Middle School, Nathan Hale High School, the Pipeline Project, and the East Side Literacy program. Students apply and increase their knowledge of the Spanish language in a real context. They are exposed to Hispanic multiculturalism and become active agents of social change in the community. Approximately 18 students participate each year.

- * *Department Scholarships:* An annual scholarship, the Susan B. Johnson Memorial Endowment Fund, is awarded to a student of Spanish for foreign study in Spain.

- * *Student Organizations/Associations:* None.

Of Special Note: 100- and 200-level Spanish courses do not count toward major/minor requirements.

Graduate Program

Graduate Program Coordinator
C104 Padelford, Box 354360
206-543-2075
spanport@u.washington.edu

The Division of Spanish and Portuguese Studies offers programs of graduate study leading to the Master of Arts degree.

The Master of Arts degree program in Hispanic Literary and Cultural Studies was reformed and updated in 2001 to foster study of Hispanic culture, literature, and language together. The program calls attention to the rich diversity of Hispanic cultural texts and to their interdisciplinary study while also promoting broad understanding of Spanish and Latin American literature. The program gives careful attention to acquainting students with the traditions of scholarship in the field as well as a range of current textual theory, criticism, and research methods. Study of Portuguese and other Romance literatures and cultures, comparative literature, Romance and Spanish linguistics, and other related disciplines may be included in the Master's degree program. The degree is earned normally in six academic quarters.

Students who wish to pursue advanced study in Spanish and Portuguese in a post-Master's degree program may do so by entering the doctoral studies programs of Comparative Literature or other departments of the University.

Master of Arts

Admission Requirements

- * Application for admission to the Graduate School
- * Three letters of recommendation
- * A Waiver Form, on which the applicant waives the write to have access to the letters of recommendation.
- * Academic autobiographical statement composed by the applicant in Spanish
- * A cassette recording (no micro-cassettes) of the applicant reading the autobiographical statement mentioned in above, together with any other informal comments the applicant wishes to make.
- * A sample of the applicant's written work in Spanish in some area of Hispanic literature and culture. This may be a copy of a paper written for a course in the area of the applicant's major.
- * Graduate Record Examination (GRE) scores
- * Foreign students should note that the Graduate School requires proof of proficiency in the English language in the form of the TOEFL (Test of English as a Foreign Language) or its computerized version (TOEFLC) or the Michigan Test and also the TSE (Test of Spoken English). A TOEFL score of 500 (or a TOEFLC score of 173) is required for admission, and a score of 580 (or 237 on the computerized form) is required for Teaching Assistant eligibility. Alternatively a Michigan Test score of 80 is required for admission and 90 for Teaching Assistantship eligibility. A minimum score of 55 is required on the TSE.

Degree Requirements

- * A total of 60 applicable credits (400 level and above), 25 of which must be at the 500 level. To remain in good standing the student must maintain a cumulative grade point average of 3.00. The minimum acceptable grade for any given course is 2.7.
- * SPAN 577 (5). Note: SPAN 510 (3) is required of all teaching assistants and is to be taken during or before a student's first quarter of teaching.
- * Distribution requirement: A minimum of 5 credits (normally one course) must be earned in each of the following areas: medieval and "Golden Age" Spain; Spain of the eighteenth and nineteenth centuries; twentieth-century Spain; colonial and nineteenth-century Latin America; and twentieth-century Latin America.
- * M.A. candidates must pass an auxiliary language reading ability examination in a language other than English and Spanish. Normally this language will be selected from among the Romance Languages and German. Students stipulate their choice at the time of first enrollment, after consultation with the Graduate Program Coordinator, and is examined no later than the fourth quarter of enrollment. The student consults first with the division's academic adviser and then completes arrangements with the language department administering the examination or with the Educational Assessment Center.
- * The M.A. examination: The M.A. examination is written in the sixth quarter of study, ordinarily in Spring quarter.
- * Thesis or essay: Students may elect to include in the required 60 applicable credits 10 credits of M.A. thesis (SPAN 700) or 5 credits of M.A. essay (SPAN 590). Neither the thesis nor the essay is a degree requirement. The M.A. thesis (minimum 40 pages of text) and M.A. Essay (minimum 20 pages) are directed by a graduate faculty member and submitted to the Graduate Studies Committee for its approval.

Financial Aid

The department awards annually a number of teaching assistantships. The assistant normally participates in teaching three classes during the academic year. Each class is limited to approximately 25 students and meets five hours a week for the ten weeks of the quarter.

Course Descriptions

See page 428.

Scandinavian Studies

318 Raitt

Scandinavian studies is concerned with the study of languages, literature, history, politics, and cultures of Denmark, Finland, Iceland, Norway, Sweden, and the Baltic States of Estonia, Latvia, and Lithuania. Emphasis is placed both on contemporary literature and culture and on historical development. Although most courses designed for majors are taught in the original languages, a broad spectrum of courses designed primarily for nonmajors is offered in English.

Undergraduate Program

Adviser
305Z Raitt, Box 353420
206-543-6099

The Department of Scandinavian Studies offers the following programs of study:

- * The Bachelor of Arts degree with a major in Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies.
- * Minors in Danish, Finnish, Norwegian, Swedish, Baltic studies, and Scandinavian area studies.

Bachelor of Arts

Suggested First- and Second-Year College Courses: First- and second-year Danish, Estonian, Finnish, Latvian, Lithuanian, Norwegian, or Swedish.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Danish, Finnish, Norwegian, or Swedish: 65 credits, of which 35 are in upper-division courses. The 65 credits include 30 credits in first- and second-year language training, 15 credits in literature courses in the chosen language, one course in Scandinavian area studies, a course in the history of Scandinavian languages or Finnish cultural studies, a course in Scandinavian literature in translation, and a senior essay (SCAND 498).

Scandinavian Area Studies: 65 credits, of which 30 are in upper-division courses. The 65 credits include 30 credits in the chosen Scandinavian or Baltic language (normally first and second year), a minimum of one course from each of four area-studies fields (Scandinavian folklore and film; literature in translation; history and mythology; society and politics), and a senior essay (SCAND 498).

Minor

Minor Requirements:

Baltic Studies: 35 credits as follows:

1. 15 credits of first year Estonian, Latvian, or Lithuanian
2. 20 credits of upper division Scandinavian coursework, including at least one Baltic studies course from the following: SCAND 344, 345, 454, 455
3. Students entering the UW with language proficiency in Estonian, Latvian, or Lithuanian beyond the first year of language training must take an additional 10 credits of upper division language courses and must earn a minimum total of 25 credits in relevant coursework

Danish, Finnish, Norwegian, or Swedish: 35 credits as follows:

1. 15 credits of first year Danish, Finnish, Norwegian, or Swedish
2. 15 credits of second year Danish, Finnish, Norwegian, or Swedish
3. 5 credits of upper division Scandinavian coursework or 5 credits of an upper division language course
4. Students entering the UW with language proficiency in Danish, Finnish, Norwegian, or Swedish beyond the first year of language training must take an additional 10 credits of upper division language courses and must earn a minimum total of 25 credits in relevant coursework.

Estonian, Latvian, Lithuanian: 35 credits as follows:

1. 15 credits of first year Estonian, Latvian, or Lithuanian
2. 15 credits of second year Estonian, Latvian, or Lithuanian
3. 5 credits of Baltic studies coursework (SCAND 344, SCAND 345, SCAND 454, or SCAND 455), or 5 credits of an upper division language course.
4. Students entering the UW with language proficiency in Estonian, Latvian, or Lithuanian beyond the first year of language training must take an additional 10 credits of upper division language courses and must earn a minimum total of 25 credits in relevant coursework.

Scandinavian Area Studies: 35 credits as follows:

1. 15 credits of of first year Danish, Finnish, Norwegian, or Swedish
2. 20 credits of upper division Scandinavian coursework
3. Students entering the UW with language proficiency in Danish, Finnish, Norwegian, or Swedish beyond the first year of language training must take an additional 10 credits of upper division language courses and must earn a minimum total of 25 credits in relevant coursework.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Graduates of the Department of Scandinavian Studies have an advanced level of proficiency in a Scandinavian, Fenno-Ugric, or Baltic language. They can talk about a wide range of concrete topics in a sustained conversation and have the ability to interpret and write about literary texts, non-fiction, and other media. Graduates also have knowledge of major figures, ideas, and institutions in Baltic or Nordic culture, history, literature, and politics that enriches a global perspective. They have the ability to research and synthesize source material in the target language and can produce a scholarly essay in English on a topic within their area of concentration.

Graduates of the Scandinavian studies program have the qualifications to embark on careers that require skills in the interpretation of information in various media, critical analysis, and effective communication and to continue in graduate programs and professional schools that value an international perspective.

- * *Instructional and Research Facilities:* None
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Internships at museums or with Scandinavian businesses are possible. Exchange program opportunities with Aarhus, Copenhagen, Linköping, Stockholm, Uppsala, Bergen, Oslo, Åbo/Turkku, and Helsinki also exist.
- * *Department Scholarships:* The department offers several scholarships for students of Danish, Finnish, Norwegian, and Swedish.
- * *Student Organizations/Associations:* The Danish Club, the Norwegian Club, the Swedish Club, and the Finnish Club.

Graduate Program

Graduate Program Coordinator
318 Raitt, Box 353420
206-543-0645
uwscand@u.washington.edu

The Department of Scandinavian Studies offers graduate programs of study leading to the Master of Arts and Doctor of Philosophy degrees. For the M.A. degree, the emphasis may be placed on Old Icelandic (Old Norse), Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies. Ph.D. degree aspirants must complete one quarter's study of Old Icelandic and concentrate their studies primarily within one of five areas: Danish language and literature, Finnish language and literature, Norwegian language and literature, Swedish language and literature, or Scandinavian area studies.

For the graduate student, the programs in Scandinavian languages and literature open several areas of study: medieval, particularly Old Icelandic; modern, including the eighteenth century; Romanticism; the Modern Breakthrough; and the twentieth century. Attention is paid to the history of the Scandinavian languages, prose, drama, and poetry. Opportunities for supervised study and specialization also exist in such areas as Scandinavian history, politics, mythology, folklore, and Baltic studies. There are also opportunities for comparative-literature study.

Master of Arts

For the M.A. degree, two options are available, each allowing the student to emphasize a target language while pursuing courses in Scandinavian languages, literature, or area studies.

1. An emphasis on Scandinavian languages and literature includes acquisition of a working knowledge of literary history, critical theory and text analysis, plus study of one secondary area.
2. An emphasis on Scandinavian area studies includes the study of Scandinavian folklore, mythology, history, politics, society, and Baltic studies, with an emphasis in one of these areas.

Admission Requirement

Bachelor of Arts degree with major in Danish, Finnish, Norwegian, Swedish, or Scandinavian area studies, or equivalent background, including advanced language proficiency in one Nordic language.

Degree Requirements

Minimum of 40 credits in courses or seminars in Scandinavian and related subjects approved by the department, of which at least 20 credits must be in courses numbered 500 and above; reading knowledge of French or German (another non-Scandinavian language may be substituted with faculty approval); written and oral examination; option between thesis and non-thesis program. Candidates in Scandinavian languages and literature must satisfy the departmental requirement in Old Icelandic.

Doctor of Philosophy

For the Ph.D. degree, the student concentrates primarily on one of two areas: Scandinavian languages and literature, or Scandinavian area studies, with an emphasis on the student's chosen target language. Major attention is given to the history of the Scandinavian languages, literary history and theory, and genre study. Opportunities for graduate work also exist in such areas as Scandinavian history, politics, mythology, folklore, and Baltic studies.

Admission Requirements

Master of Arts degree with major in Scandinavian languages and literature or equivalent background.

Degree Requirements

40 credits beyond the master's degree in courses or seminars in Scandinavian languages and literature and related subjects approved by the department, one quarter's study of Old Icelandic, a reading knowledge of French and German (other non-Scandinavian languages may be substituted with faculty approval), General Examination for admission to candidacy, 27 credits of SCAND 800 (dissertation) taken over at least three quarters, and a Final Examination on the dissertation.

Financial Aid

Teaching assistantships in Danish, Finnish, Norwegian, Swedish, and Scandinavian Area Studies are usually available, as well as occasional research assistantships. If funding allows, a Baltic-language teaching assistantship may be available.

Course Descriptions

See page 431.

Slavic Languages and Literatures

M253 Smith

Slavic languages and literatures include the principal East European languages and literatures and Slavic linguistics. Languages include Bulgarian, Czech, Polish, Romanian, Russian, Croatian/Serbian, and Ukrainian.

Undergraduate Program

Adviser
M253A Smith, Box 353580
206-543-6848
slavicll@u.washington.edu

The Department of Slavic Languages and Literatures offers the following programs of study

- * The Bachelor of Arts degree with a major in Slavic languages and literatures with options in Russian and East European languages and culture
- * Minors in Russian language, Russian literature/Slavic literatures, and Slavic languages.

Bachelor of Arts

Suggested First- and Second-Year College Courses: First- and second-year Russian. Courses that develop writing skills.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Both options must be completed with a minimum cumulative GPA of 2.50 in all RUSS and SLAV courses completed (UW and transfer), with a minimum grade of 2.0 in each course presented for the major. Transfer students are required to complete at least 15 graded credits in Slavic department courses at the UW.

Russian Option (60 credits beyond second year):

1. RUSS 301, RUSS 302, RUSS 303, or the equivalent
2. RUSS 401, RUSS 402, RUSS 403, or the equivalent
3. RUSS 321, RUSS 322, RUSS 323, RUSS 451
4. 10 credits from the following: RUSS 324, RUSS 351, RUSS 352, RUSS 420, RUSS 421, RUSS 422, RUSS 423, RUSS 424, RUSS 425, RUSS 430, RUSS 461, RUSS 490, SLAV 351, SLAV 420, SLAV 423, SLAV 425, SLAV 426, SLAV 490; HSTEU 444, HSTEU 445.

East European Languages and Culture Option (55 credits):

1. Two years of a principal East European language, or the equivalent
2. SLAV 351
3. 20 credits of literature, culture, linguistics, and history, as appropriate.

Minor

Minor Requirements:

Transfer students are required to complete at least 15 graded credits in Slavic department courses at the UW.

Russian Language: 25 credits to include RUSS 301, RUSS 302, RUSS 303 and 10 credits from RUSS 351, RUSS 352, RUSS 401, RUSS 402, RUSS 403, RUSS 451, SLAV 351, SLAV 425.

Russian Literature/Slavic Literatures: 25 credits to include RUSS 321, RUSS 322, RUSS 323 and 10 credits from RUSS 420, RUSS 421, RUSS 422, RUSS 430, RUSS 461, RUSS 490 (Russian-literature option), or 10 credits from CR SB 420, CZECH 420, POLSH 420, SLAV 420, SLAV 423, SLAV 490 (Slavic-literatures option).

Slavic Languages: 25 credits to include language courses in a Slavic language (other than Russian) numbered 404, 405, 406; SLAV 351; and 5 credits from CR SB 420, CZECH 420, POLSH 420, SLAV 423, SLAV 490.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Graduating majors in Slavic languages and literatures have a solid command of a Slavic language with speaking, listening, reading and writing, and translation skills at the intermediate high or advanced level. They have a broad knowledge of the history of the relevant country, and of its modern culture. Students in the literature and culture option have a general knowledge of major periods and detailed knowledge of two or three particular authors or genres. Students in the linguistics option have a good understanding of Slavic languages in general and the language of their specialization in particular, as well as knowledge of major issues in contemporary phonology, morphology, and syntax. All students develop good general analytical skills and the ability to explore and understand another culture through mastery of its language.
- * *Instructional and Research Facilities:* None.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* None.
- * *Department Scholarships:* Vadim Pahn Scholarship for continued study of Russian in an intensive summer language program.
- * *Student Organizations/Associations:* Rodnoi Ugolok, the Russian student society

Graduate Program

Graduate Program Coordinator
M268 Smith, Box 353580
206-543-6848

The Department of Slavic Languages and Literatures offers a complete program of courses and seminars leading to the Master of Arts and Doctor of Philosophy degrees in Russian and East European languages, literatures, and cultures. Languages taught in the department include Czech, Old Church Slavonic, Polish, Russian, and Croatian/Serbian.

The graduate program is organized to permit completion of the master's degree in four to six quarters and the doctoral degree in three additional years. The duration of each program, however, will depend on the extent of the student's preparation upon entrance into the program.

Master of Arts

Admission Requirements

A student seeking admission to the M.A. program should have a bachelor's degree in Russian or Slavic Studies which includes four years of Slavic

language study. Applicants with equivalent experience and basic coursework in Slavic literatures, cultures and history will be considered. A student not meeting these requirements may be given conditional admission but will be expected to make up any deficiencies. Consideration will be given to those with three years of language who enroll in 4th-year Summer Intensive Russian the quarter before entry into the program.

All students entering the program will take a diagnostic language test to establish their level of proficiency and determine what further instruction may be necessary.

Degree Requirements

40 credits minimum, as follows:

- * Required Slavic core courses, 8 credits: RUSS 501 (2), RUSS 502 (3), SLAV 501 (2)
- * Required Slavic core course, one of the following (2-3 credits): SLAV 518 (2), SLAV 519 (3)
- * Required Slavic linguistics courses, 10 credits from the following: SLAV 550 (5), SLAV 551 (5), SLAV 570 (3-5, max. 15)
- * Required Slavic literature courses, 10 credits from the following: RUSS 521 (5), RUSS 522 (5), RUSS 523 (5), SLAV 520 (5)
- * Elective courses, 10 credits from above or from the following: BCS 403 (5), BCS 420 (5), CZECH 403 (5), CZECH 420 (5), POLSH 403 (5), POLSH 420 (5), RUSS 520 (5, max. 20), RUSS 526 (5, max. 15), RUSS 542 (5, max. 20), RUSS 543 (5), RUSS 570 (5), RUSS 577 (5), SLAV 420 (5, max. 15), SLAV 423 (5), SLAV 425 (5), SLAV 426 (5), SLAV 490 (3-5, max. 15), SLAV 565 (4), SLAV 566 (4)

Examinations

- * *Russian Language:* This examination is based on texts given to the student on the day before the exam. For the exam itself, clean copies of the texts are supplied and the student has three hours to translate specified passages and write an essay. After the exam, the student will discuss (in Russian) the content and language of the texts with two examiners. The exam is graded High Pass, Pass, and Fail. Students failing the exam must repeat RUSS 501 and/or RUSS 502 before taking the exam again. A High Pass is normally required for admission to the Doctoral Program.
- * *Other Slavic Languages:* Students whose program is centered around a Slavic language other than Russian will make special arrangements for further study and eventual testing in their target language.
- * *M.A. Comprehensive Exams:* The M.A. Examinations are normally in three fields and taken within a period of two weeks. They are four hours long taken in situ. With the permission of the advisor, students may request three-day take-home essays (usually from Friday morning to Monday morning).

Doctor of Philosophy

Admission Requirements

Applicants to the doctoral program in Slavic Languages and Literatures are expected to possess an M.A. or equivalent degree. They are admitted by vote of the graduate faculty on the basis of their language skills (Slavic and English), general background in Slavic cultures, and a comprehensive statement of purpose.

Degree Requirements

- * *Coursework:* At least 90 credits, including graduate course credits taken toward the M.A. Degree, and at least one full year of residence at the University of Washington.
- * *Readings:* The size of the department's doctoral program dictates that many of the post-M.A. credits will be satisfied with individually arranged Readings Courses. The courses should be mutually agreed upon by the student and the Committee Chair and they should be organized with an eye to the comprehensive examinations. Those with an emphasis on Slavic linguistics will be expected to include a third Slavic language as a field.
- * *Comprehensive Examinations:* As a prerequisite for scheduling the General Examination, the candidate must demonstrate reading ability in a language appropriate for research purposes. This requirement may be fulfilled either by taking a standardized examination in the appropriate language or by an in-house examination given by a member of the Graduate Faculty of the Slavic Department. The two-hour exam will

consist of a journal article (5-7 pages), which the student will summarize and a portion of which s/he will translate. The particular language may be negotiated by the student with his or her advisor on the basis of the research interests of the student.

The student takes four Written Field Examinations, which will be followed two weeks later by the General (Oral Comprehensive) Examination. One of the Field examinations may be in a third Slavic language or in a field from another department at the university. At the discretion of the examiner, the examinations may be either four-hour examinations in situ or three-day take-home essays. A student may be excused from one field examination if the Committee accepts a paper published in a reviewed journal in lieu of that examination.

The student will discuss each potential examination with the examiner for that field, presenting, where required, a personal reading list for the field.

Upon completion of the Written Examinations, the exams and the comments prepared by each examiner will be made available to all members of the Committee as well as to the student. The examinations will be kept in the student's permanent file in the departmental office.

The General (Oral Comprehensive) Examination must be set up with the Graduate School at least three weeks before the examination is scheduled. The procedure is described in the Graduate Student Services' how-to instructions on the web.

Part of the Oral Comprehensive Examination is usually a presentation of the dissertation proposal.

- * *Dissertation and Defense*: After the successful completion of the General Examination, the candidate submits a detailed dissertation prospectus to be approved by the Supervisory Committee. The candidate must register for a minimum of three quarters of Slavic 800 at a maximum of 10 credits per quarter before submitting a dissertation for defense. With the approval of the Dissertation Reading Committee (usually a subset of the Supervisory Committee), the candidate will defend the dissertation in a Final Examination open to the graduate faculty of the university and invited guests.

Research Facilities

The Suzzallo Library holdings include some 400,000 titles in Slavic languages and in other languages on Slavic subjects. It subscribes to all important periodicals and newspapers in Russian and other languages and has exceptionally strong holdings in rare and antiquarian Slavic titles on microfilm and microfiche.

Assistantship Opportunities

The department regularly offers a number of teaching assistantships. In conjunction with the Henry M. Jackson School of International Studies, students in the department are eligible for several other types of fellowships.

Course Descriptions

See page 435.

Social Science (Evening Degree)

103 Lewis Hall

This multidisciplinary major includes upper-division social science courses selected by faculty of the College of Arts and Sciences. Students explore diverse political, social, environmental, gender, ethnic, and cultural perspectives in pursuit of their degrees. Coursework encourages greater understanding of issues, ideas, and themes in history and in the contemporary world. Analytical, research, and communication skills which can enhance a person's career opportunities are emphasized.

The coursework in social science is organized into three tracks:

- * Social and Environmental Issues
- * Law, Politics, and the Economy
- * Gender, Ethnicity, and Culture

Social and Environmental Issues addresses key ecological, environmental, and social issues of tribal, peasant, industrial, and post-industrial societies

from around the world. This track includes assessments of how technological, ecological, environmental, economic, cultural, and sociopolitical factors interact to affect the form and function of social, cultural, and political systems and institutions. It also features courses which explain classical and contemporary theories of anthropology, economics, geography, history, political science, and sociology bearing on these issues.

Law, Politics, and the Economy deals with the role and function of government, legal institutions, and economic and political processes, focusing on the complex interaction of political and economic forces which shape social life. Important areas of study include the character of political power and inequality, law and other sources of state legitimacy, international relations and the economic interdependence of nation-states, and the role of the state in maintaining social order and ameliorating conflict within and between societies.

Gender, Ethnicity, and Culture studies the cultural, geographic, historical, political, psychological, and social factors which define, shape, and change the various peoples of the United States. Racism, age and sex discrimination, the status and role of women, the treatment of immigrants, the emergence of classes and sociocultural interest groups, and aspects of religious movements and religious conflict are core topics. Courses assessing theories that examine and explain these issues are also essential.

Undergraduate Program

Adviser
103 Lewis Hall, Box 353921
206-543-6160
advisers@extrn.washington.edu

Social Science offers the following program of study:

- * The Bachelor of Arts degree with a major in social science

Bachelor of Arts

Suggested First- and Second-Year College Courses: English composition and additional writing. Introductory courses in Individuals & Societies (I&S); Visual, Literary, & Performing Arts (VLPA); and Natural World (NW). First-year foreign language study.

Program Admission Requirements

1. Admission to the Evening Degree program (separate from admission to the UW day program).
2. 75 college quarter credits. Most students admitted have completed two years of lower-division college work.
3. See adviser for evaluation of applicable courses and credits.

Major Requirements

60 credits from the approved list of social science survey and track courses, as follows:

1. Survey courses (15 credits maximum). Normally at the 200 level.
2. Primary track (25-35 credits from one track).
3. Track electives (10-20 credits). From courses in other than the primary track.
4. Of the 60 credits, not more than 15 in 200-level courses, at least 45 in 300- and 400-level courses, and at least 15 in 400-level courses.
5. For list of applicable courses, consult the adviser or go to http://www.evedegree.washington.edu/edp/majors/social_courses.asp

Additional Degree Requirements

1. English composition and additional writing (15 credits)
2. Quantitative and Symbolic Reasoning (Q/SR) (4-5 credits)
3. Foreign language – through the third quarter of a single foreign language (0 to 15 credits, depending on placement)
4. Areas of Knowledge
 - a. Visual, Literary, & Performing Arts (VLPA) (20 credits)
 - b. Individuals & Societies (I&S) (20 credits)
 - c. Natural World (NW) (20 credits)
 - d. Some credits in I&S and/or VLPA may count also toward the major
5. Additional work to complete a minimum 180 credits overall.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Social science graduates are prepared to think critically and communicate effectively about the interplay among political, demographic, cultural, and social dynamics in considering domestic and international legal, media, environmental, gender, and ethnicity issues. They are able to examine complex issues in a contemporary and historical context. Majors develop the ability to analyze and evaluate issues from varied disciplinary perspectives. A greater respect for diversity and the ability to integrate knowledge when applying learning to the challenges of living in a complex global society results.

Specific skills acquired include writing, critical thinking, research, analytical thinking, integrative cognitive abilities, and effective public speaking.

Social science majors pursue widely varied careers, including labor relations, human resources, law, social work, broadcast journalism, corporate training, private enterprise, education, public administration, mental health, marketing, and non-profit management.

* *Instructional and Research Facilities:* Students use all university library resources and facilities corresponding with their individual research needs. In addition, each of the contributing social science academic departments offers individual resources to majors. Check with advisers for options.

* *Honors Options Available:* None offered.

* *Research, Internships, and Service Learning:* The program works collaboratively with students interested in pursuing independent study and research opportunities through academic departments that contribute to the major. Opportunities for work with the Carlson Center, Office for International Exchanges, and service learning are possible for all students.

* *Department Scholarships:* The Evening Degree program awards need-based financial aid assistance each year to students from a general fund. Two additional scholarship resources are the Rodney I. Straub Endowed Scholarship and the Nicole Snyder Dettmar Endowed Scholarship.

* *Student Organizations/Associations:* None

Sociology

202 Savery

The Department of Sociology has a strong commitment to research, publication, and training and is dedicated to providing a rich undergraduate program, both for students majoring in sociology and for others who wish to learn about human society and social relations.

Undergraduate Program

Adviser
117 Savery, Box 353340
206-543-5396
asksoc@u.washington.edu

The Department of Sociology offers the following program of study

* The Bachelor of Arts degree with a major in sociology

Bachelor of Arts

Suggested First- and Second-Year College Courses: SOC 110, SOC 212, SOC 240, SOC 270, SOC 271, or any 200-level sociology courses. General coursework developing critical thinking or analytical skills.

Department Admission Requirements

1. Any two of the following: SOC 110 or SOC 111, SOC 212, SOC 240, SOC 270, SOC 271.
2. Minimum cumulative GPA of 2.50 for all courses applied to major requirements at the time of application. Special circumstances will be reviewed on a case-by-case basis.
3. Minimum grade of 2.0 in each course applied to major requirements.

4. Minimum cumulative GPA of 2.00 for all prior college work.
5. A one- to two-page personal statement.
6. Application deadlines are the second Friday of each quarter. All applicants who meet the qualifications stated above will be admitted in time to register as Sociology majors for the following quarter.

Major Requirements

50 credits as follows:

1. Introductory courses (10 credits): Two courses from SOC 110 or SOC 111, SOC 212, SOC 240, SOC 270, and SOC 271.
2. Sociological methods and theory (10 credits): SOC 220 (5) and SOC 316 (5).
3. Upper division sociology electives (20 credits): Chosen from any 300-level or 400-level sociology courses, excluding SOC 316, SOC 395, and independent study courses (SOC 399, SOC 499).
4. Sociology electives (10 credits): Chosen from any other sociology courses. A maximum of five credits of independent study (SOC 399, SOC 499) can be counted.
5. Minimum grade of 2.0 in any course applied to major requirements. Minimum cumulative GPA of 2.50 for courses applied to major requirements. 25 of 50 required sociology credits completed in residence at UW.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The Department of Sociology's undergraduate degree is oriented toward a traditional liberal arts education, with the aim of educating majors to think in a systematic way about the relationships among individuals, groups, organizations, and societies. Sociology majors engage in current research in areas including political sociology, social stratification, race and ethnicity, deviance and social control, and demography. Sociology majors also develop quantitative and analytical skills in research methods and social theory courses.

* *Instructional and Research Facilities:* The department is a member of the Center for Social Science Computing and Research (CSSCR). CSSCR maintains an extensive data archive, and offers consulting support and computer lab access to students in Sociology courses. Sociology is also affiliated with the Center for Studies in Demography and Ecology (CSDE) and the Center for Statistics and the Social Sciences (CSSS), providing interdisciplinary courses, seminars, and research opportunities for Sociology students.

* *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.

* *Research, Internships, and Service Learning:* Sociology majors participate in a variety of internships each quarter. Students can receive academic credit under the supervision of a Sociology faculty member. See adviser for details.

* *Department Scholarships:* None offered.

* *Student Organizations/Associations:* A chapter of the Alpha Kappa Delta International Sociology Honor Society organizes events involving undergraduates with faculty and graduate students.

Graduate Program

Graduate Program Coordinator
117 Savery, Box 353340
206-543-5396
asksoc@u.washington.edu

Sociology seeks to explain social structure, social institutions, and social interaction. There are three emphases in the graduate training program at the University of Washington: understanding and critically evaluating social theory and empirical research; doing theoretically guided research that explores, assesses, and further develops explanatory theories; and developing communication skills (with emphasis on teaching and scholarly writing) that will be useful in transmitting sociological knowledge. The department has graduate program specialization in demography and ecology, deviance and social control, race and ethnic relations, family systems, gender studies, institutional analysis, quantitative research methodology, social psychology, sociological theory, and stratification.

Emphasis is on empirical research aimed at developing explanatory theories. Students are trained in problem formulation, research design, data gathering and analysis, and bringing data to bear on significant questions. Instruction is offered in various methods: statistical, survey, demographic and ecological, field research, and historical. Students learn social research by participating in faculty projects or developing their own studies. Also available is a program training students to teach.

Master of Arts

Admission Requirements

- * Applicants for admission to the Master of Arts program are evaluated on undergraduate performance, Graduate Record Examination scores, statement of educational plans, recommendations, and samples of written work.
- * *Application Deadlines:* Admission offers are made for autumn quarter only and the annual departmental application deadline is January 15. Because of new immigration policies and visa regulations, the UW Graduate Admissions Office strongly recommends that international applicants submit the required application materials to their office by November 1
- * *Application Materials:* All information about the University of Washington Department of Sociology graduate program and the application materials are online. The Department of Sociology no longer sends out printed information or application materials. All applicants are expected to use the web-based application. Applying to the sociology graduate program involves application to both the University of Washington Graduate School and the Department of Sociology. See departmental Web site for more information.

Degree Requirements

The master's program is designed primarily as preparation for Ph.D. work; it is not a terminal degree, although it may serve as good training for non-academic research. The M.A. program consists of three elements:

- * Substantive training: coursework in substantive areas and social theory.
- * Methodological training: work in social statistics, general social science methodologies, and a data analysis practicum.
- * The master's thesis: independent empirical research conducted under the supervision of the M.A. Committee.

Students working toward an M.A. degree must complete 45 graduate credits or more with a minimum cumulative GPA of 3.30:

- * Sociological Theory -- SOC 510 (3)
- * Statistics -- SOC 504, SOC 505, SOC 506 (3, 3, 3)
- * Logic of Social Inquiry -- SOC 508 (3)
- * Proseminar -- SOC 501 (1, 1, 1)
- * M.A. Thesis -- SOC 700 (9)
- * Electives -- 18 credits.

A minimum of 12 graded elective credits must be in courses offered by the sociology department. All courses should be at the 500 level or above, although a student may petition for inclusion of a 400-level course. No more than 3 elective credits may be assigned a letter grade (e.g., S or CR) in place of a numerical grade. Minimum GPA of 3.30.

Doctor of Philosophy

Admission Requirements

For admission to the Ph.D. program, students are expected to have completed an M.A. degree in sociology in this department or elsewhere. Occasionally, M.A. degrees in other fields are accepted as a basis for admission to the Ph.D. program. The department encourages applications from minority students.

See above under Master of Arts section for admission requirements.

Degree Requirements

45 credits beyond the Master of Arts requirements (above) as follows:

- * 3 graded credits in theory
- * 6 graded credits in approved methods
- * 9 elective credits
- * 27 dissertation credits

Additionally, students must maintain a GPA of 3.30, pass a minor area exam, pass a major area exam, pass the General Exam (prospectus defense), pass the Final Exam, and submit approved dissertation to the Graduate School.

Financial Aid

Fellowships, research assistantships, and teaching assistantships are available to qualified graduate students including those in their first year of training.

Course Descriptions

See page 438.

Speech and Hearing Sciences

210 Eagleson

Speech and hearing sciences concern the processes and disorders of human communication. This includes the study of normal hearing, speech, and language development, speech acoustics, speech physiology and perception, hearing, the nature of language, speech and hearing disorders in children and adults, social and cultural aspects of communication disorders, and the clinical processes involved in identification, prevention, and remediation of those disorders.

Undergraduate Program

Adviser
210 Eagleson, Box 354875
206-685-7403
sphscadv@u.washington.edu

The Department of Speech and Hearing Sciences offers the following program of study:

- * The Bachelor of Science degree with a major in speech and hearing sciences

Bachelor of Science

Suggested First- and Second-Year College Courses: PSYCH 101, BIOL 118, LING 200, introductory math and statistics courses.

Department Admission Requirements

Admission is competitive. The admissions committee reviews all applicants based on the following criteria: GPA (minimum 2.50 overall GPA guarantees consideration but not admission), personal statement reflecting an interest in and commitment to speech and hearing sciences; other evidence of a commitment to becoming a speech and hearing sciences major. Students may apply any time after they have earned 60 credits. The application deadline for current UW students is Monday of the third week of the quarter for admission the next quarter; transfer students may apply to the department and the University concurrently. Admission is for autumn, winter, or spring quarter. Only students admitted to the UW are eligible for admission to the major. Applicants will be notified of the department's decision within four weeks. Applications and additional information are available outside 210 Eagleson and on the department's Web site.

Students who meet admission requirements are eligible for one of two options: Option 1, General Academic, is intended to provide broad perspectives of the discipline, but not to prepare students specifically for careers in clinical speech pathology and audiology. It is appropriate for students with interests in education, health care, and communication. Option 2, Speech and Hearing Sciences and Disorders, is intended for students interested in graduate study in speech and hearing sciences and clinical speech-language pathology and audiology. (Note that graduate study is required for the professions of speech language pathologist and audiologist.)

Major Requirements

Core Requirements for Both Options: 32 credits in the following courses: SPHSC 250, SPHSC 261, SPHSC 302, SPHSC 303, SPHSC 304, SPHSC

320, SPHSC 371, SPHSC 461. A cumulative GPA of 3.00 is required in core courses for students following Option 2.

Option 1, General Academic: 71-73 credits as follows:

1. Core requirements listed above (32 credits)
2. 22 credits from the following: SPHSC 305, SPHSC 308, SPHSC 405, SPHSC 406, SPHSC 425, SPHSC 445, SPHSC 462, SPHSC 499 (6 credits maximum)
3. BIOL 118 (5 credits)
4. A 3-5 credit college-level mathematics course (not including MATH 098, MATH 100, MATH 102, MATH 103, or other remedial, historical, or methodology math course) or statistics course (not including STAT 111)
5. Minimum 9 credits at the 200 level or above in psychology, educational psychology, or special education, or 300 level or above in linguistics.

Option II, Speech and Hearing Sciences and Disorders: 81-83 credits as follows:

1. Core requirements listed above (32 credits)
2. SPHSC 305, SPHSC 308, SPHSC 405, SPHSC 406, SPHSC 425, SPHSC 445, SPHSC 471, SPHSC 481 (32 credits)
3. BIOL 118 (5 credits)
4. A 3-5 credit college-level mathematics (not including MATH 098, MATH 100, MATH 102, MATH 103, or other remedial, historical, or methodology math course) or statistics course (not including STAT 111)
5. Minimum 9 credits at the 200 level or above in psychology, educational psychology, or special education, or 300 level or above in linguistics.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The graduate will (1) have knowledge of the following: mechanisms involved in speech, language, and hearing; societal implications of language differences and of disorders of speech, language, and hearing; opportunities in, and requirements for, careers available to those in the speech and hearing sciences. (2) understand the following: normal acquisition of speech and language; the etiology and nature of communication disorders across the lifespan; principles and procedures for diagnosis and treatment of speech, language, and hearing disorders; the manner in which context (specifically, situation, social/interpersonal, and culture context) influences communication and disorders; social-cultural aspects of communication development and disorders. (3) have the following abilities: to analyze language in terms of its auditory, phonetic, phonological, morphological, and syntactic properties; to utilize strategies for solving scientific problems; to read and understand relevant literature; (4) have experience with a research project
- * *Instructional and Research Facilities:* Research labs, computer lab, and clinic located in the department.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* None offered
- * *Department Scholarships:* None offered
- * *Student Organizations/Associations:* The National Student Speech Language Hearing Association (NSSLHA) UW chapter, 153 Eagleson.

Graduate Program

Graduate Program Coordinator
205 Eagleson, Box 354875
206-685-7402
sphscadv@u.washington.edu

The Department of Speech and Hearing Sciences offers the Master of Science, Doctor of Audiology, and Doctor of Philosophy degrees. The program consists of a wide range of course work and seminars providing opportunities for the development of scholarly and professional competence in various areas of specialization: speech and language acquisition, phonetics, speech production, hearing, hearing development, psychoacoustics, physiological acoustics, speech perception, and human communication disorders related to language, speech, and hearing. At the Doctor of Audiology (Aud) and speech-language pathology master's (SLP MS) level, the specific focus is on the clinical procedures involved in the identification, prevention, and remediation of communication disorders. To complement departmental curricula in various specialization areas, close interdisciplinary

relationships are maintained with other University departments and off-campus centers. Advanced degrees in the speech and hearing sciences equip the student to do research, to teach at the college and university level, and to provide clinical services to the communicatively impaired.

Master of Science

Admission Requirements

- * GRE scores
- * A minimum GPA of 3.00 during the last 90 quarter credit hours of study (60 semester)
- * Bachelor's degree with a major in Speech-Language Pathology (Speech and Hearing Science, Communication Disorders, or a similarly named major) or other major with postbaccalaureate certification in Speech-language Pathology.
- * Entrance to the program is during summer and autumn quarters only. Deadline is February 1st.

Degree Requirements

113 credits, as follows:

- * Basic Science Coursework (40.5 credits):
 - o 18 credits with 9 credits minimum in the biological or physical sciences and math or statistics with at least one course in biological or physical science and one course in math or statistics; and 9 credits minimum in the behavioral and/or social sciences
 - o 22.5 credits in basic human communication processes (normal development and use of speech, language and hearing) with at least one course in anatomic and physiological bases, at least one course in physical and psychophysical bases, and at least one course in linguistic and psycholinguistic aspects
- * Professional Coursework (54 credits):
 - o Speech-Language Pathology Certification: 54 credits must concern the nature, prevention, evaluation, and treatment of speech, language, and hearing disorders. 45 credits must be in speech-language pathology. 45 credits (not necessarily the same 45 as above) of the 54 credits must be at the graduate level. (A maximum of 9 credits from practicum and 9 credits from thesis may count towards the total 54 credits and the 45 credits SLP, but not applied to the following subcategories.) 31.5 credits of the 45 credits in SLP must be at the graduate level, 9 credits of which must be in speech disorders and 9 credits of which must be in language disorders.
 - o Audiology: 9 credits of the 54 credits must be in audiology courses. 4.5 credits must be in hearing disorders and evaluation. 4.5 credits must be in habilitative/rehabilitative procedures with individuals who have hearing impairment.
- * Additional SPHSC credit hours (18 credits): 18 additional credits in speech, language, and hearing coursework distributed between the Basic Science Coursework and the Professional Coursework.
- * Additional program requirements: Minimum of 36 quarter credits of non-practicum graduate work at the 400 level or above. Minimum of 18 of the 36 quarter credits in courses numbered 500 and above. No more than 9 credits of courses 500 level and above can be thesis credits. Satisfactory completion of all didactic and practicum requirements detailed above. Satisfactory completion of written thesis and oral defense of the thesis. Minimum of 9 quarter credits of thesis (SPHSC 700) for students taking thesis option. Students completing the thesis must take a course in statistics at the 400 level or above.
- * Students will also satisfactorily complete requirements for the Certificate of Clinical Competence of the American Speech-Language-Hearing Association by registering for the required coursework and practica, pre-internship and internship credits.

Doctor of Philosophy

Admission Requirement

Students who wish to work toward the Ph.D. degree must have completed a bachelor's or master's degree depending upon area of interest. Since the doctoral program does not lead to clinical or professional certification, students who wish to satisfy minimum standards of clinical competence in speech-language pathology or audiology typically complete the majority of this preparation before entering the doctoral program.

Degree Requirements

The academic programs for students in the Ph.D program are planned on an individual basis in consultation with the student's faculty committee.

Concentration can occur in basic and applied research. Courses, seminars, laboratory experiences, and assistantships are selected to provide preparation for careers in research and university or college teaching. Opportunities for additional clinical work in the area of communication disorders are provided to those having such interests.

Doctor of Audiology

Admission Requirements

- * Graduate School application
- * Departmental application
- * Transcripts for all colleges and universities attended
- * Personal statement
- * Three recommendation forms

Degree Requirements

203 credits as follows:

- * *Year 1 (62 credits):* SPHSC 509 (3), SPHSC 521 (4), SPHSC 523 (4), SPHSC 570 (4), SPHSC 571 (4), 572 (3), 574 (4), SPHSC 575 (3) or SPHSC 503 (3), SPHSC 577 (3), SPHSC 582 (4), SPHSC 583 (4), SPHSC 588 (3), SPHSC 591 (4) each quarter, 592 (3)
- * *Year 2 (56 credits):* SPHSC 462 (3) or SPHSC 580 (3), SPHSC 490 (3), SPHSC 504 (3), SPHSC 542 (3), SPHSC 575 (3) or SPHSC 503 (3), SPHSC 576 (2), SPHSC 578 (2), SPHSC 581 (2), SPHSC 585 (2), SPHSC 588 (1, 1, 1) for three quarters, SPHSC 591 (4, 4, 4) for four quarters, SPHSC 593 (3), SPHSC 594 (2), SPHSC 595 (2), SPHSC 600 (3), electives (4).
- * *Year 3 (55 credits):* SPHSC 462 (3) or SPHSC 580 (3), 522 (2), SPHSC 579 (2), SPHSC 584 (3), SPHSC 587 (2), SPHSC 588 (1, 1, 1) for three quarters, 590 (1), SPHSC 591 (4, 4, 4) for three quarters, plus 10 credits for summer quarter), SPHSC 600 (3, 3, 3) for three quarters, electives (8).
- * *Year 4 (30 credits):* Full-time clinic (SPHSC 591) for three quarters.

Financial Aid

A number of teaching and research assistantships are available for qualified graduate students. In addition, the department has traineeships/fellowships supported by the National Institutes of Health.

Research Facilities

The department's research laboratories, as well as those of the Virginia Merrill Bloedel Hearing Research Center, contain sophisticated equipment for the collection and analysis of data related to the study of human communication and its disorders. The University Speech and Hearing Clinic and the Center on Human Development and Disability also provide laboratories to support basic and applied research in speech, language and hearing development and disorders, across the life span.

Course Descriptions

See page 444.

Statistics

B313 Padelford

Probability provides the conceptual foundation and mathematical language for the logic of uncertainty and induction. Statistics is concerned with procedures for the acquisition, management, exploration, and use of information in order to learn from experience in situations of uncertainty and to make decisions under risk. Statistical practice includes design of experiments and of sampling surveys; exploration, summarization, and display of observational data; drawing inferences, and assessing their uncertainty; and building mathematical models for systems with stochastic components.

Instruction is enriched through academic contacts with the School of Business Administration; the College of Engineering; the departments of Applied Mathematics, Atmospheric Sciences, Biology, Cardiology, Computer

Science, Earth and Space Sciences, Economics, Genetics, Mathematics, Psychology, Radiology, and Sociology; the Quantitative Ecology and Resource Management program; the Center for Statistics and the Social Sciences; the Applied Physics Laboratory; the Applied Statistics Division of the Boeing Company; Microsoft Research; and Insightful Corporation. The department has an especially close relationship with the Department of Biostatistics; for example, the two departments are jointly developing new curricula in statistical genetics.

Undergraduate Program

Adviser
B309 Padelford, Box 354322
206-543-8296

The Department of Statistics offers the following programs of study:

- * The Bachelor of Science degree with a major in statistics
- * In conjunction with the departments of Applied Mathematics, Computer Science and Engineering, and Mathematics, the Bachelor of Science degree with a major in applied and computational mathematical sciences.
- * A minor in statistics

Bachelor of Science

Suggested First-and Second-Year College Courses: CSE 142; CSE 143; MATH 307, MATH 308, MATH 309, MATH 327, MATH 328. Additional courses in the sciences and quantitative methods. It is recommended that the student declare the major only after completion of STAT 341.

Department Admission Requirements

1. Completion of 45 credits, including MATH 124, MATH 125, MATH 126; a minimum 8 credits from one of the following groups of courses: ASTR 101, ASTR 102, ASTR 190, ASTR 201, ASTR 301; CHEM 120, CHEM 142, CHEM 145, CHEM 152, CHEM 155; GENOME 351, GENOME 372, GENOME 453, GENOME 455; PHYS 114, PHYS 115, PHYS 116, PHYS 117, PHYS 118, PHYS 119, PHYS 121, PHYS 122, PHYS 123, PHYS 210, PHYS 211, PHYS 212; and one course from STAT 220, STAT 311, STAT 390, or an approved substitute. The 8 credits must be from within the same group (e.g., CHEM 142, CHEM 152).
2. Minimum grade of 2.0 in each of the above listed prerequisites and a cumulative GPA of 2.80 for these courses.
3. Students wishing to declare a statistics major must apply by contacting the adviser after prerequisites are completed and graded.

Major Requirements

Minimum 71 credits, as follows:

1. MATH 124, MATH 125, MATH 126; MATH 307, MATH 308, MATH 309; MATH 327, MATH 328 (the honors sequences in calculus may replace the corresponding regular sequences)
2. CSE 142, CSE 143
3. One course from STAT 220, STAT 311, STAT 390, or approved substitute (STAT 311 is recommended)
4. STAT 394, STAT 395, followed by STAT 341, STAT 342, STAT 421, STAT 423.
5. Electives (at least 9 credits): one upper-division course in statistics, mathematics, or computer science, plus two upper-division courses in any discipline (including but not limited to statistics, mathematics, and computer science), all subject to prior approval by the Statistics adviser. The first elective defines the flavor of the major within these interrelated mathematical fields, and the other two give a chance to broaden the basis of the major into a special-interest area, chosen from the full range of upper-division courses offered at the University. However, three Department of Statistics courses is the most common choice. Any other choice must fit into an approved coherent plan.
6. A minimum grade of 2.0 in all courses used to satisfy major requirements.
7. A minimum cumulative GPA of 2.50 for all courses used to satisfy major requirements.

Minor

Minor Requirements: 38 credits, as follows:

1. MATH 124, MATH 125, MATH 126

2. STAT 311 or approved substitute
3. STAT 394, followed by STAT 341, STAT 342, STAT 421 (or STAT 423)
4. One elective from the following choices: STAT 395 (strongly recommended), STAT 396, STAT 403, STAT 423, STAT 427, STAT 428, CSE 142, MATH 307, MATH 308, AMATH 351, AMATH 353.
5. A minimum grade of 2.0 in each course used to satisfy minor requirements.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Statistics emphasizes decision making in the face of uncertainty. Tools developed by the major include probability theory, mathematical statistics, experience with data analysis, and use of statistical tools via the computer. Graduates have pursued careers in actuarial science, financial planning, drug development, statistical consulting, teaching, public health, military science, aerospace, computer technology, and forest resources.
- * *Instructional and Research Facilities:* Computer workstations are available on a drop-in basis through the Mathematical Sciences Computing Center. Tutoring in a set of introductory statistics courses is currently available at the Statistics Tutor and Study Center.
- * *Honors Options Available:* None offered.
- * *Research, Internships, and Service Learning:* Some students receive limited support and the opportunity to participate in the VIGRE program which, funded by the National Science Foundation, encourages undergraduates to participate in research; sometimes students function in teams with faculty and graduate students. A special seminar series for undergraduates is offered in conjunction with the ACMS program.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* The Actuary Club at the University of Washington, <http://students.washington.edu/actuary>

Graduate Programs

Graduate Program Coordinator
B309 Padelford, Box 354322
206-543-8296

The graduate programs emphasize both the theory and application of statistics, including probability theory, mathematical statistics, data analysis, statistical computing, and scientific applications. Computing facilities in the Department of Statistics rank among the best of any statistics programs in the country and reflect the department's expertise in the field of statistical computing. An ongoing statistical consulting program provides the students with practical experience in using statistics and in communicating with clients. Under faculty supervision, participants in the program assist members of the University community in applying statistical methodology. The department offers Master of Science and Doctor of Philosophy degrees.

Admission Requirements

Background in mathematics, statistics, or a quantitative field, with 30 or more quarter credits in mathematics and statistics, to include a year of advanced (second-year) calculus, one course in linear algebra, and one course in probability theory; Graduate Record Examination scores (the Advanced Mathematics subject test is encouraged but not required); and three letters of recommendation from appropriate former or current faculty.

Master of Science

Degree Requirements

In addition to Graduate School requirements, at least twelve approved courses numbered 400 or above with a value of 36 credits or more; of these, at least six courses must be numbered in the 500 series (exclusive of STAT 512, 513) with a value of 18 credits or more, and with a coherent theme. Approved proficiency in statistical computing. Satisfactory participation in statistical consulting and the departmental seminar. Passage of an appropriate final master's examination or successful completion of a master's thesis which can count as up to three courses worth 9 credits but cannot replace any of the six courses in the 500 series mentioned above. All programs must be approved in advance by the departmental graduate

program coordinator.

Doctor of Philosophy

Degree Requirements

In addition to Graduate School requirements, appropriate training in statistics and related sciences. Appropriate General Examinations of basic graduate-level knowledge in statistics and probability (including two preliminary examinations). Satisfactory performance in MATH 574, 575, 576. Satisfactory performance in three approved core-course sequences chosen from STAT 570, 571, 572; 581, 582, 583; 521, 522, 523; 534, 535, 538; and 516, 517, 518. (In some circumstances, other graduate-level mathematical science courses may be used as a substitute.) Approved performance in statistical consulting (typically STAT 598 and 599). Demonstration of proficiency in computing. 1 credit of STAT 590 per quarter. Final Examination.

The graduation requirements for the Ph.D. tracks in statistical genetics and statistics in the social sciences may replace or be in addition to some of the requirements listed above.

Financial Aid

The department annually awards a limited number of teaching and research assistantships and fellowships for the support of new and continuing graduate students on the basis of academic promise.

Course Descriptions

See page 446.

Women Studies

B110 Padelford

Women studies is an interdisciplinary discipline that offers students a cohesive framework for the study of women's and men's lives within historical and contemporary contexts, and from multi-disciplinary, multi-cultural, and international perspectives. As a field of inquiry, women studies challenges traditional scholarship about human societies and fosters the construction of new theoretical and methodological approaches to understanding diverse experiences and realities.

Undergraduate Program

Adviser
B110C Padelford, Box 354345
206-543-6902
wsadvise@u.washington.edu

The Department of Women Studies offers the following programs of study:

- * The Bachelor of Arts degree with a major in women studies
- * A minor

Bachelor of Arts

Suggested First- and Second-Year College Courses: WOMEN 200, and any of the following: WOMEN 206, WOMEN 257, WOMEN 283, WOMEN 290.

Department Admission Requirements

Any student with a cumulative GPA of at least 2.00 can declare this major at any time.

Major Requirements

Minimum 62 credits, as follows:

1. WOMEN 200 or equivalent, two credits of WOMEN 299, and one course from WOMEN 206, WOMEN 257, WOMEN 283, WOMEN 290, or transfer equivalent
2. WOMEN 322 or WOMEN 456 (may overlap with option or upper-division requirement); WOMEN 357 (may overlap with option requirement)
3. One course in feminist theory (WOMEN 455 is recommended for those

planning to pursue graduate study. See department adviser for a complete list of acceptable courses.)

4. The senior thesis sequence of WOMEN 491, WOMEN 492, and WOMEN 493.
5. A minimum of 3 credits of WOMEN 497 fieldwork
6. 10 additional upper-division credits within the major
7. Completion of a 25-credit interdisciplinary concentration. Concentrations can include up to 15 credits of upper-division courses from other departments. Students may select pre-approved concentrations or design a concentration specific to their academic interest in consultation with adviser.

Minor

Minor Requirements: 30 credits as follows:

1. WOMEN 200
2. One of the following: WOMEN 206, WOMEN 257, WOMEN 283, WOMEN 290, or transfer equivalent
3. WOMEN 322 or WOMEN 456
4. 15 additional upper-division credits in women studies (excludes independent-study courses)

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* A Bachelor of Arts in Women Studies helps students prepare for careers in human, health, legal, or civil service, as well as in the private sector. Some women studies graduates develop careers that focus directly or indirectly on women and women's issues. Many others move into careers that entail understanding the dynamics of gender, race, class, and sexuality. Such positions exist in politics, business, education, government, medicine, and the arts. Recent graduates of women studies have found employment in public agencies, community services, health services, private businesses, and legal firms.
- * *Instructional and Research Facilities:* The Women Studies Technology Center (WSTC)
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Students intern in local agencies or businesses to develop skills in an area of specialization appropriate to their area of interest. For lists of these opportunities, see adviser.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* Students can join the National Women's Studies Association (NWSA), as well as a local student group, Feminism on Campus (FOC).

Graduate Program

Graduate Program Coordinator
B110 Padelford, Box 354345
206-543-6900
womenst@u.washington.edu

The Department of Women Studies offers graduate training leading to the Master of Arts and Doctor of Philosophy degrees in interdisciplinary women studies as well as in a chosen discipline. The core faculty represent the following disciplines: anthropology, American Indian studies, economics and development, history, international studies, English, sociology, and psychology. Although students are required to work primarily with a core faculty member in Women Studies, they have the opportunity to study with more than 60 faculty members from a wide range of disciplines who are adjunct faculty to Women Studies. M.A. students must complete a thesis or practicum. Ph.D. students must complete a dissertation.

Admission Requirements

Applicants are admitted to begin study during autumn quarter only and are required to have their application materials completed by the beginning of the prior January. A complete application file includes the Graduate School application, one copy of official transcripts, three recommendations, a statement of purpose, and scores from the Graduate Record Examination (GRE).

Program Requirements

All students are required to complete 15 credits of the core seminars: History of Feminism (WOMEN 501), Problems in Feminist Theory (WOMEN 502), and Feminist Research and Methods of Inquiry (WOMEN 503). Under the guidance of a core faculty mentor and advisory committee, the student shapes an individual program of study. The master's program usually requires two years of graduate study; the doctoral program usually requires three years of study beyond the master's level, including independent field research and preparation of a dissertation. Ph.D. students must exhibit proficiency in a language relevant to their theoretical and regional areas of specialization. Students are urged to establish foreign language competency as undergraduates before entering the graduate program or as early as possible in their graduate careers.

Financial Aid

A limited number of teaching and research assistantships are offered to Ph.D. students.

Course Descriptions

See page 449.

Business School

Dean

Jim Jiambalvo
114 Mackenzie

Associate Dean for Academic Affairs

Thomas Lee

116 Mackenzie

busadmin@u.washington.edu

Men and women embarking on business careers have the opportunity to influence many of the social, political, and economic forces in today's world. The Business School prepares students for professional careers in management and related disciplines in both the private and public sectors.

The Business School offers an undergraduate program leading to the degree of Bachelor of Arts in Business Administration (BABA) and graduate programs leading to the degrees of Master of Business Administration (MBA), Executive Master of Business Administration (EMBA), Technology Management Master of Business Administration (TMMBA), Master of Professional Accounting (MPAcc), and Doctor of Philosophy (PhD). An evening MBA program is also offered. Additionally, the Business School offers a Master of Science degree in Information Systems (MSIS).

Business Administration became an independent unit within the University system in 1917. It has been accredited by the American Assembly of Collegiate Schools of Business (now known as the International Association for Management Education) since 1921.

Facilities and Services

Most Business School classes and activities are in four buildings. Balmer Hall, named for Thomas Balmer, former president of the University Board of Regents, contains classrooms and computer labs. There are four computer labs in Balmer Hall that are available to Business School students. Mackenzie Hall, named in memory of Prof. Donald Mackenzie, Chair of the Department of Accounting from 1949 to 1955, contains the Dean's Office, the Undergraduate Program Office, the Graduate Program Office, the PhD Program Office, Business Administration Computer Services (BACS), Office of Development and External Relations, faculty offices, five department offices, and other business administration program offices. Nearby Lewis Hall contains the Business Connections Center and other faculty and administrative offices. A fourth building, on the north side of Balmer, has three distinct components: the Bank of America Executive Education Center (which includes the James B. Douglas Executive Forum), the Boeing Auditorium, and the Albert O. and Evelyn Foster Business Library.

To serve the continuing education needs of middle- and senior-level managers, the Business School offers a number of certificate programs, either University-initiated or co-sponsored with various community and industry organizations. The Management Program, a nine-month, one night per week program, strengthens understanding and skills in all areas of management and provides an opportunity for successful managers to learn from a distinguished faculty and each other. Short courses and seminars are offered throughout the year, focusing on topics such as leadership, finance and accounting for non-financial executives, and negotiation skills. In addition, the School develops and runs custom programs under contract with individual companies and organizations. Information on continuing education programs may be obtained from the Office of Executive Programs, (206) 543-8560, fax (206) 685-9236, uwexp@u.washington.edu. International Business Programs

International business programs are coordinated and developed by the School's Global Business Center. These activities include special graduate and undergraduate certificate programs, the Global Business Program, seminars, internships, business foreign-language programs, special guest-speaker programs, and study tours. Although the Marketing and International Business Department offers a general curriculum in international business, each of the five academic departments within the School maintains faculty with special international teaching and research expertise. Internationally oriented courses are offered by each department.

At the undergraduate level, the School offers the Certificate of International Studies in Business (CISB) Program. Students in the program complete the same demanding business curriculum as other students and enhance this training with foreign language study, area studies, and an international experience. The program requires that students have a solid foundation in

one of six language tracks: Chinese, French, German, Japanese, Russian, and Spanish; a seventh custom track for other languages is also an option.

At the MBA level, the Business School offers the Global Business Program (GBP) that provides opportunities for MBA students to build on the international business foundation that every MBA develops through the first year of the program. In addition to international business electives, the GBP includes overseas travel through study tours, quarter-long exchange programs, and international internships. GBP students also participate in the weekly Global Business Forum, which brings top international business leaders to campus to discuss important issues facing their companies and industries.

Questions regarding these programs may be directed to the Program Assistant, CIBER, 303 Lewis, (206) 685-3432, fax (206) 685-4079, uwciber@u.washington.edu.

Entrepreneurship Programs

The focus of the Business School's entrepreneurship programs is on nurturing skills that generate creative ideas, innovative processes, and new business growth. These skills are developed through special academic certificate programs, a high-tech entrepreneurship speaker series, internships, a business plan competition, club activities, and consulting opportunities with area businesses.

The Center for Technology Entrepreneurship (CTE) is open to both undergraduate and graduate students from the Business School as well as other schools and colleges of the University. Undergraduates who wish to complete the option must be admitted to the Business School. Graduate students who wish to complete this specialization must participate in the CTE consulting club, attend the High-Tech Entrepreneurship Speaker Series, complete several CTE core classes, and participate in the Business Plan Competition. Contact CTE for more information at 206-685-9868, cte@u.washington.edu.

The Business and Economic Development Program (BEDP) matches undergraduate and graduate student consulting teams with small-business owners in Seattle's inner city to implement business development projects. Through courses, independent study options, summer internships, and hands-on projects with inner-city entrepreneurs, students explore the challenges faced by central city businesses, while also providing valuable assistance. Questions about the Business and Economic Development Program can be directed to the program office at (206) 543-9327.

The University of Washington Retail Management Program (RMP) prepares interested students for first-line management careers in the retail industry. This interactive program includes visiting speakers, executives-in-residence, and store visits. Participating students complete a series of courses and a summer internship. The various facets of the program are designed to provide students with a comprehensive background in retail management. Questions about the Retail Management Program can be directed to the program office at (206) 685-2755.

Business Career Center

The Business Connections Center coordinates all MBA and MPAcc career services. These include career counseling and career management workshops, the administration of special career events such as career fairs, company presentations, on-campus MBA and MPAcc recruitment, and a job-listing service. The Business Connections Center also administers alumni and executive mentoring programs. Questions regarding these programs and services may be directed to the center's office, 202 Lewis, (206) 685-2410.

Undergraduate business-career counseling and on-campus recruitment is provided by the UW Center for Career Services, 134 Mary Gates Hall, (206) 543-0535.

Instructional Resources Office

The Instructional Resources Office promotes excellence in teaching by providing resources in current practice and research in teaching and learning. The office serves faculty and teaching assistants with individual consultations, coordinates a teaching preparation program for doctoral students, and offers assistance with instructional innovations. Questions can be directed to the Instructional Resources Office, 317 Lewis, (206) 685-9608.

The Business Writing Center

The mission of the Business Writing Center is to help undergraduates develop the writing skills essential to professional success. The center offers one-on-one tutoring, workshops and peer feedback for special class projects, and opportunities for advanced students to be peer tutors. Questions can be directed to the center's office, 337 Lewis, bwrite@u.washington.edu.

Honor Societies

Beta Gamma Sigma is the national scholastic honor society in the field of business. Election to membership is available to both undergraduate and graduate students in business. Selection is based on outstanding scholastic achievement.

Beta Alpha Psi is the accounting honor society. Membership is based primarily on scholastic achievement, but some community service is also required. Beta Alpha Psi provides a mechanism for students, professionals, and educators to meet on both formal and informal bases.

The goals and interests of graduate students are served by the MBA Association, Business Consulting Network, Challenge for Charity, Entrepreneurship and Innovation Club, Graduate Consulting Club, MBA Finance Club, Global Business Association, Graduate and Professional Student Senate, MBA Marketing Club, Net Impact, High-Tech Club, MBA Speakeasy, Women in Business, and the Doctoral Association.

Undergraduate Program

137 Mackenzie

Associate Dean

Roland E. "Pete" Dukes

Director

Vikki Haag Day

Associate Director

Elaine G. Solomon

Adviser

137 Mackenzie, Box 353200
(206) 685-3400
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The Business School offers the following programs of study:

- * The Bachelor of Arts in Business Administration degree with options in accounting, entrepreneurship, finance, human resources management, information systems, and marketing.

Bachelor of Arts in Business Administration

Suggested First- and Second-Year College Courses: English composition, calculus, ECON 200, ECON 201. In addition, classes to fulfill general education requirements which develop strong writing and analytic skills. ACCTG 215, ACCTG 225, MGMT 200, and Q METH 201 are suggested second-year college work.

Department Admission Requirements

The Business School offers admission to upper division applicants for autumn and winter quarters. Those UW students who are prepared, as freshmen, to apply for early admission, may do so only for autumn quarter. Students admitted for autumn may elect to take classes during the prior summer quarter.

Applicants are considered in three admission groups, the Freshman Admission Program (FRAP), the Early Admission Group (EAG), and the Upper-Division Admission Group (UAG), described below. The following requirements apply to the Early Admission Group, and the Upper-Division Admission Group:

1. A minimum cumulative GPA of 2.50 for all college course work.
2. A minimum cumulative GPA of 2.50 for all required business courses.
3. A student who has previously attended the UW also must have GPAs of at least 2.50, both UW cumulative and in UW business courses.

4. Since eligible applicants exceed the space available, acceptance is competitive. Admission will be based on evaluation of five factors:
 - a. for Early Admission Group, pre-college test scores from SAT or ACT
 - b. overall scholastic record
 - c. grades in pre-application courses, described below
 - d. written communication skills
 - e. evidence of leadership skills, community activities, and the promise of achievement in a business or professional career.

Consideration is also given to such factors as economic and educational disadvantage, significantly higher recent grades, and exceptional extracurricular activities or work experience.

Admission for UAG is offered twice a year, for autumn and winter quarters. Admission for FRAP and EAG is offered once a year, for autumn quarter only. A Business School application, together with all supporting materials, must be on file by April 5 for autumn quarter admission or October 5 for winter quarter admission. Records of all course work completed by the deadline must be submitted at the time of application, regardless of admission group.

Freshman Admission Program (FRAP)

The Business School enrolls a small number of students each year directly out of high school, prior to necessary completion of any university-level prerequisites. Freshmen applicants to the University listing Business Administration as their intended major are automatically considered. Admission is offered to students with exceptionally competitive academic records, including but not limited to high school GPA and SAT or ACT scores.

Early Admission Group (EAG)

This admission path is open to students who began their studies at the UW as freshmen, have been enrolled no more than three quarters, and have completed 30 numerically graded credits at the UW. Courses completed prior to applying must include ECON 200; MATH 112, MATH 124, MATH 134, or MATH 145; an approved English composition course chosen from C LIT 240, ENGL 104-ENGL 105, ENGL 111, ENGL 121, ENGL 131, ENGL 197, ENGL 198, ENGL 199, or ENGL 281; and pre-college test scores (ACT or SAT). General education or elective courses can be taken to complete the minimum of 30 graded credits.

Upper-Division Admission Group (UAG)

Students must present a minimum of 60 academic credits at the time of application including the following graded credits: ACCTG 215; ECON 200 or ECON 201; MATH 112, MATH 124, MATH 134, or MATH 145; an approved English composition course, chosen from C LIT 240, ENGL 104-ENGL 105, ENGL 111, ENGL 121, ENGL 131, ENGL 197, ENGL 198, ENGL 199, or ENGL 281. In addition, the following courses must be completed prior to admission in autumn quarter: ACCTG 225; ECON 200 and ECON 201; MGMT 200; QMETH 201. Applicants should take general education or elective courses to complete the minimum of 60 graded credits.

Students admitted to the UW as freshmen are expected to take ACCTG 215, ACCTG 225; MGMT 200; and QMETH 201 in residence.

Qualified applicants with at least 45 credits and a minimum 2.85 GPA who meet University admission requirements, but not Business School requirements, are eligible to be placed in the College of Arts and Sciences as pre-business majors.

The University of Washington provides equal opportunity in education without regard to race, color, creed, religion, national origin, sex, sexual orientation, age, marital status, disability, or status as a disabled veteran or Vietnam veteran in accordance with University of Washington policy and applicable federal and state statutes and regulations.

Graduation Requirements

180 credits as follows:

General Education Requirements: The following must be selected from the University Areas of Knowledge courses: 20 credits in Visual, Literary, & Performing Arts; 20 credits in Individuals & Societies, including 10 credits in microeconomics and macroeconomics (ECON 200 and ECON 201); 20 credits in the Natural World, including 5 credits in calculus (MATH 112, MATH 124, MATH 134, or MATH 145); most students need precalculus

before taking college calculus (some precalculus courses qualify for the Natural World requirement); 5 credits in English composition.

Students from community colleges in Washington should check the Transfer Guide or consult with their community college adviser for equivalent courses. Students from other four-year schools should see an adviser at their school. Students entering the Business School under the terms of the Associate Degree Agreement may apply courses selected from the community college's breadth list toward the general education requirements.

Business School Requirements: ACCTG 215, ACCTG 225; QMETH 201; MGMT 200; B ECON 300; MKTG 301; I S 300; I BUS 300; OPMGT 301; FIN 350; MGMT 300; MGMT 320; MGMT 430; and 300- or 400-level business electives (or area of concentration) to bring the total number of business credits to 72; two writing-intensive courses, one from B CMU 301, B CMU 302, B CMU 410, ENGL 281, ENGL 381; one from English composition, or from the remaining three courses listed immediately above, or from any W course. No more than 6 lower-division business elective credits; a minimum of 90 non-business credits, which may include up to 14 credits economics and up to 9 credits of statistics but not GEN ST 350; a cumulative GPA of at least 2.50 in all business credits earned at the UW; and a cumulative GPA of 2.50 for all UW credits. No more than 8 credits of business independent research coursework may be applied to the degree and no more than 4 credits of business independent research coursework may be applied to upper-division business electives. No more than 8 credits of internship coursework is applicable to the degree. Business internship credit may not apply to the upper-division business elective requirement. Students must complete six of the nine upper-division core courses, including MGMT 430, and 40 of the 53 required upper-division business credits at the UW. Students who have taken more than three of the nine upper-division core business courses at another school should consult an academic adviser in the Business School Undergraduate Program Office prior to applying.

Accounting Option: The notation "Accounting" is indicated on the permanent record, or transcript, of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes the following courses with a minimum cumulative GPA of 2.50: ACCTG 301, ACCTG 302, ACCTG 303, ACCTG 311, ACCTG 320, ACCTG 411, ACCTG 421, ACCTG 440, and at least one 400-level accounting elective, excluding ACCTG 401, ACCTG 490, ACCTG 495, and ACCTG 499. Students who have completed ACCTG 505 may not apply to the Accounting Option.

Finance Option: The notation "Finance" is indicated on the transcript of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes the following courses with a minimum cumulative GPA of 2.50: one course from FIN 450, FIN 453, FIN 454, or FIN 457; either FIN 460 or FIN 461; four additional courses chosen from the 400-level FIN courses, B ECON 301 or ECON 301, or the 400-level B ECON courses, excluding FIN 490, FIN 495, FIN 499, B ECON 490, and B ECON 499.

Human Resources Management Option: The notation "Human Resources Management" is indicated on the transcript of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes the following courses with a minimum cumulative GPA of 2.50: MGMT 311, MGMT 411, MGMT 412, and two of the following courses: MGMT 323, MGMT 401, MGMT 402, MGMT 403, MGMT 404, or MGMT 413.

Information Systems Option: The notation "Information Systems" is indicated on the transcript of a student who graduates with a degree of Bachelor of Arts in Business Administration and who complete the following courses with a minimum cumulative GPA of 2.50: I S 310, I S 320, I S 410, I S 445, and I S 460.

Marketing Option: The notation "Marketing" is indicated on the transcript of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes the following courses with a minimum cumulative GPA of 2.50: MKTG 450, MKTG 460, and three additional MKTG electives, excluding MKTG 490, MKTG 495, and MKTG 499. It is recommended that students take MKTG 450 and MKTG 460 before they take the other electives.

Center for Technology Entrepreneurship (CTE): The notation "Entrepreneurship" is indicated on the transcript of a student who graduates with a degree of Bachelor of Arts in Business Administration and who completes one of two pathways with a minimum cumulative GPA of 2.50.

All students are required to complete ENTRE 370 and two of the following three courses: MKTG 455, FIN 457, or MKTG 335. Entrepreneurship students must take MGMT 430 to complete one of the core requirements for the Business School.

Students in the Business Creation pathway must complete ENTRE 472 and ENTRE 473. Students in the Business Growth pathway must complete ENTRE 475 and ENTRE 476.

Admission to the options: Students can apply to one option at the same time they apply to the Business School. Continuing Business School students can apply during publicized application periods. If demand for the option exceeds the number of spaces available, students will be considered based on the factors identified for admission to the Business School and on their grade-point average in all previous option-specific courses.

Student Outcomes and Opportunities

- * **Learning Objectives and Expected Outcomes:** A business education develops important communication and interpersonal skills. The ability to express an idea, negotiate a settlement, motivate others, manage time, and build collaborative networks distinguishes the most successful business people. UW Business School students learn to recognize and define problems, examine data, and persuasively communicate their ideas to achieve results in organizations and people's lives. Regardless of post-graduation path -- be it climbing up the corporate ladder, starting a company, joining the Peace Corps, entering law school, or becoming a doctor -- a business education will help immeasurably.
- * **Instructional and Research Facilities:** The Foster Business Library houses an extensive collection of books, reference tools, and journals necessary to the study of business. Balmer Hall has wireless capabilities for faculty and student use and houses three computer labs with 120 workstations. The virtual NASDAQ trading room equipped with trading and analytical software allows students to simulate stock transactions using real-time market data and stock quotes so they can study diversification, hedging, and other investment strategies. The New Venture Creation Lab represents a new paradigm for integrating entrepreneurial education with technology development and hands-on experience. The lab features computer workstations, proprietary software, online technology and market assessment tools and data to assist student entrepreneurial efforts. The Business Writing Center provides free consultations on business class writing assignments, cover letters, and resumes.
- * **Honors Options Available:** Honors students benefit from a sense of community generated by honors seminars, as well as from the academic challenge associated with more rigorous study. The program requirements are flexible, challenging students to explore business topics in greater depth. Students entering the Honors program become candidates for the degree "With College Honors" or "With Distinction."
- * **Research, Internships, and Service Learning:** The Business School encourages student participation in internships to supplement in-class learning experiences. For more information about internship guidelines and a list of undergraduate internship opportunities, visit depts.washington.edu/bschool/internships/.
- * **Department Scholarships:** The Business School awards approximately 90 undergraduate scholarships. Some are general scholarships while others are specific to options or areas of concentration. Only students admitted to both the UW and the Business School are eligible to receive awards. Applicants are considered for all scholarships for which they meet the minimum qualifications and specific criteria. Although financial need is not a requirement for all business scholarships, most are awarded on the basis of need. (The FAFSA must be filed with the Office of Student Financial Aid.) The Business School scholarship application is due April 5.
- * **Student Organizations/Associations:** Chapters of Alpha Kappa Psi, Association of Black Business Students, Undergraduate Entrepreneurship Club, International Association of Students in Economics and Business (AIESEC), American Marketing Association, Business Information Technology Society, Dow Dawgs Investment Club, Hispanic Business Association, Society for Human Resources Management, Business and Economic Development Program Leadership Team, Undergraduate Finance Club, Undergraduate Management Consulting Association, University Sales Club, and Undergraduate Leadership Forum provide opportunities for undergraduate students to meet informally and to participate in a variety of projects and events.

Of Special Note:

Double Baccalaureate and Second Baccalaureate

Students who wish to earn more than one baccalaureate degree should consult an academic adviser in the Business School Undergraduate Program Office, either during or before their junior year. Persons seeking a second baccalaureate should apply at the University's Office of Undergraduate Admissions. To be considered, applicants must complete by quarter of entry the same prerequisites for admission as applicants for the first baccalaureate degree. Since the number of eligible applicants exceeds that for which space is available, acceptance will be competitive, based on the criteria listed above for selection of first baccalaureate degree applicants. The Business School will use the GPA for the last 90 credits earned.

Undergraduate Business Educational Opportunity Program

Director, Jai-Anna Elliott

Recruitment, admissions counseling, advising, and support services are available for minority students underrepresented at the University, and students from educationally and economically disadvantaged backgrounds. Special scholarships are also available for underrepresented minority students. Academic advisers have information on the Business Educational Opportunity Program.

Graduate Programs

Associate Dean for Masters Programs

David Burgstahler

Admission

Qualified students who are graduates of the University of Washington or other accredited colleges or universities may be admitted to graduate degree programs. GPA, Graduate Management Admission Test score, work experience, educational and professional objectives, and other factors are considered in the admission process. Inquiries concerning the details of admission should be made to the specific degree program of interest, University of Washington, Graduate School of Business Administration, Mackenzie Hall, Box 353200, Seattle, WA 98195.

Application Procedure

Applications to the MBA, EMBA, and PhD programs are considered for entry in autumn quarter only. Applications to the Technology Management MBA and Master of Science in Information Systems program are considered for entry in winter quarter only. The formal deadlines for application are February 1 for the PhD program; December 1, January 1, February 1, and March 1 for domestic applicants for the MBA; February 1 for international applicants for the MBA; April 1 for Evening MBA; and April 15 for the Executive MBA and MPAcc programs. Students are encouraged to apply as early as possible for the programs.

The Graduate School of Business Administration offers programs of study leading to the advanced degrees of Master of Business Administration, Master of Professional Accounting, Master of Science in Information Systems, and Doctor of Philosophy. Four programs can lead to an MBA degree: the full-time program, the evening program, the Technology Management (TMMBA) program, and the Executive MBA program.

Master of Business Administration

Executive Director

Dan Poston
110 Mackenzie Hall, Box 353200
206-543-4661
mba@u.washington.edu

The full-time Master of Business Administration degree program has been designed for students who are preparing for a professional career in management. A period of two academic years, or 96 academic credits, is required for most students to complete the MBA program. The first year of the program consists of 48 credits of required courses: B A 500 (16), B A 501 (16), B A 502 (10); three of the following bridge elective options: EBIZ 509 (2) (required for EBIZ certificate), ENTRE 509 (2) (required for CIE certificate), FIN 509 (2) (prerequisite for most finance electives), I BUS 509 (2), MGMT 579 (2-4, max. 12), or MKTG 509 (2). The second year of the

program is 48 credits of elective courses. The student may take no more than 24 credits in any one elective area.

The evening MBA program is targeted toward fully employed college graduates who seek a management degree that can be earned outside their regular working hours. Instruction takes place two evenings per week and students typically take two courses per quarter. The program consists of 80 academic credits, with normal completion of degree requirements in ten quarters. The course requirements are as follows: ACCTG 500 (4), ACCTG 501 (4), B ECON 500 (4), B ECON 501 (4), FIN 502 (4), I S 504 (4), MGMT 500 (4), MGMT 502 (4), MGMT 505 (2), MKTG 501 (4), OPMGT 502 (4), QMETH 500 (2), QMETH 501 (2), 34 credits of electives

Special Programs

Within the MBA program, there are options for special study: Global Business Program; E-Business Program, and the Program in Entrepreneurship and Innovation. The following concurrent degree programs are also available: MBA/JD with the School of Law, MBA/MAIS with the Henry M. Jackson School of International Studies, MBA/MSE with the College of Engineering's Program in Engineering and Manufacturing Management, and MBA/MHA with the School of Public Health and Community Medicine.

Executive Master of Business Administration

Director

Louise Kapustka
206-685-1333
emba@u.washington.edu

Since the autumn of 1983, the Executive MBA Program has provided an additional pathway to the Master of Business Administration degree. The EMBA program provides an intensive executive-development experience to a select group of midcareer managers who continue to work full-time while pursuing the MBA degree. Candidates for this two-year program should have seven or more years of increasingly successful work experience including three to four years in management, and currently hold mid- or top-level management positions. They are typically sponsored by their organizations and have been identified as employees with high potential to advance as general managers. Students are selected to ensure diversity of industry, functional areas and organizational size.

The Executive MBA degree program is offered in two scheduling options. Both run for two academic years, September through June. (1) The Regional Program meets on campus for a full day once a week, on alternating Fridays and Saturdays. In addition, students attend spring and fall residence sessions each year. (2) The North America Program meets on campus once a month, generally for three consecutive days, Thursday through Saturday. Between monthly sessions, students continue to interact with faculty and classmates online via the Internet and interactive groupware. This format is designed for individuals from the greater Northwest as well as those from the Puget Sound area whose schedules preclude weekly attendance.

While the scope of the curriculum is comparable to that of the regular MBA program, the pace is more intense and the perspective is that of a general manager. There are 21 required courses and no electives.

Admission Requirements

- * Letter of Endorsement: Candidates must be sponsored by their employing organizations and endorsed by senior management as potential general managers. In sponsoring EMBA candidates, organizations agree to release them on class days and, in some cases, to cover the program fee. Individuals who are not sponsored by a company, will need to submit an additional letter of recommendation in place of the Letter of Endorsement.
- * Three letters of recommendation
- * Graduate Management Admission Test (GMAT) scores
- * Two sealed copies of official transcripts from all degree-granting institutions attended

Applications are accepted throughout the year, with an application deadline of April 15 for the class beginning each autumn. Late applications are handled on a space-available basis.

Degree Requirements

The 21-month, 68-credit curriculum builds a solid foundation of business fundamentals. Case studies and group projects link theory with current

business practice. Themes based on current trends in business, including the impact of technology and globalization, are threaded through the entire curriculum.

Students frequently use their own organizations as laboratories, applying lessons learned in the classroom and then bringing the results back to the class for further discussion.

The following are the required courses: EMBA 502 (2), EMBA 503 (2), EMBA 504 (4), EMBA 505 (5), EMBA 506 (3), EMBA 510 (3), EMBA 511 (1), EMBA 512 (4), EMBA 520 (5), EMBA 521 (4), EMBA 529 (2, 2), EMBA 530 (3), EMBA 531 (5), EMBA 532 (5), EMBA 533 (4), EMBA 534 (2), EMBA 540 (2), EMBA 551 (4), EMBA 552 (2), EMBA 558 (4).

Technology Management Master of Business Administration

Director

206-221-6995
tmmba@u.washington.edu

The Technology Management MBA Program is designed for professionals who are employed in technology companies or who work in technology jobs in more traditional businesses. The curriculum combines the essential components of management education with a specialized focus on high-tech industries. It is structured for individuals who want to play a broader role in management and are seeking the necessary management skills and business knowledge. The program is focused on real-world projects and analyses, collaborative learning in study groups and extensive participant interaction in the classroom. Candidates for this 18 month program have technology experience and upward career progression.

The Technology Management MBA Program provides an intensive educational experience to professionals who will continue to work full-time while pursuing their MBA degree. The TMMBA Program runs six consecutive quarters of instruction-beginning every January and ending the next year in June. Three-hour sessions are held once a week on a mid-week evening and six-hour sessions are scheduled two Saturdays per month. There are 68 required credits of which 6 are electives. Additionally, two residential sessions are offered one at the beginning of the program and one at the end. Candidates may be sponsored by their organizations or apply on their own.

Admission Requirements

- * Applicants should hold a professional position and have a minimum of five years of work experience. Applicants must demonstrate a career trend of increased responsibilities or promotions. Supervisory or management experience is not required, but applicants should demonstrate leadership potential. Candidates' work accomplishments and letters of recommendation should provide evidence of their potential for senior management.
- * Applicants must hold a baccalaureate degree from an accredited college or university.
- * Personal statement
- * Three letters of recommendation and evaluations
- * Resume
- * Interview
- * GMAT scores
- * Two sealed copies of official transcripts
- * Additional requirement for permanent residents: Proof of English language proficiency (if applicable)
- * Additional requirements for international applicants: International Graduate Admissions Application, Proof of Financial Ability form, photocopy of current visa (if applicable), notice of action (if applicable), proof of English language proficiency (if applicable)

Each year approximately 50 students are accepted into the TMMBA Program. Applications are accepted throughout the year. Please contact the TMMBA office to find out the applications deadlines for the upcoming class.

Degree Requirements

TMMBA 500 (1, 1), TMMBA 501 (5), TMMBA 502 (4), TMMBA 503 (2, 2), TMMBA 505 (4), TMMBA 507 (4), TMMBA 510 (4), TMMBA 512 (4), TMMBA 515 (4), TMMBA 516 (4), TMMBA 517 (4), TMMBA 520 (4), TMMBA 521 (2), TMMBA 522 (4), TMMBA 528 (2, 2), TMMBA 530 (1), TMMBA 551 (4), 6 credits of electives

Master of Professional Accounting

Managing Director

Francine Shafer
231 Mackenzie
206-616-4964

The Master of Professional Accounting (MPAcc) prepares students for high-level careers with major accounting and consulting firms, governmental agencies, and industry. Students with undergraduate degrees in accounting may complete the program in three quarters. Students with no prior business background must take an expanded version of the program. Enrollment is limited to 25 to 30 students in each of two tracks-Accounting and Assurance (A&A) and Taxation. MBA students with a strong interest in accounting and taxation may earn a joint MBA/MPAcc degree.

Admission Requirements

- * Satisfactory completion of prerequisite courses (see Web site for list of prerequisite courses)
- * Scores from the GMAT exam
- * International TOEFL scores
- * Well written essays
- * Work experience
- * Volunteer and student activities

Degree Requirements, Auditing and Assurance Pathway

48 credits, as follows:

- * ACCTG 521 (4) , ACCTG 523 (4) , ACCTG 527 (4) , ACCTG 576 (2) , ACCTG 566 (4), ACCTG 577 (4), ACCTG 579 (4, 4, 4)
- * *Internship*: ACCTG 575 (14). If no internship, complete four approved elective classes: ACCTG 420 (3), ACCTG 524 (3), ACCTG 525 (4), ACCTG 562 (4) ACCTG 564 (4)

Degree Requirements, Taxation Pathway

48 credits, as follows: ACCTG 530 (4), ACCTG 531 (3), ACCTG 533 (3), ACCTG 534 (3), ACCTG 535 (3), ACCTG 536 (3), ACCTG 537 (3), ACCTG 538 (3), ACCTG 539 (4), ACCTG 541 (4) , ACCTG 541 (4), ACCTG 543 (3), ACCTG 547 (3)

Doctor of Philosophy

Program Coordinator

Jaime Banaag
102 Mackenzie
206-543-4111
baphd@u.washington.edu

The Ph.D. program in business administration is a research-based program designed to train scholars interested in academic careers, although this training is also useful for individuals seeking research positions in business and government, as well as in consulting firms.

With the guidance of faculty members who have similar interests, Ph.D. students complete a program of formal coursework (a minimum of 18 courses) and participate in doctoral seminars, independent study, and research. A faculty supervisory committee is appointed early in the program to assist each student in constructing a course of study that fits that individual's background and interests. Students select one major area of specialization and complete requirements in two or three additional minor areas that support their major area of specialization (including areas outside the Business School, such as economics, psychology, and mathematics). Throughout the program, doctoral students receive support and training that hone their skills as teachers and course developers.

Major areas of concentration include accounting, finance, human resource management and organizational behavior, marketing, information systems, operations management, operations research, and strategic management. All doctoral students are required to have research methods as one of their minor areas.

Doctoral study is full-time and year-round, and students are admitted autumn quarter only. Most candidates will require four to five years to complete the program. The School's goal is to make financial aid available, in the form of research and teaching assistantships, to all of its doctoral students. In addition to service appointments, fellowships are available on a

competitive basis to support students engaged in their dissertation research during the final part of their programs.

Special Requirements

Applicants to graduate business programs are required to submit scores on the Graduate Management Admission Test. Those admitted to the MBA program must demonstrate understanding of the fundamental concepts of calculus.

Course Descriptions

See page 453.

Business School Departments

Accounting

Accounting involves development and communication of financial and operational information for business and nonprofit economic entities. The curriculum includes understanding accounting information systems, using accounting information in managerial decision making, preparing and auditing financial statements under generally accepted accounting and auditing standards, and understanding the fundamental aspects of personal and corporate taxation. Elective courses provide in-depth instruction in managerial and financial accounting, not-for-profit accounting, and taxation. Courses provide a foundation for careers in accounting (public, industrial, private, or governmental), for a general business career, or for other professions such as law.

Finance and Business Economics

Finance and Business Economics address the financial and economic aspects of business decision making. The Finance curriculum focuses on financial management and the financial markets within which firms and individual investors operate. Business Economics courses concern the economic behavior of firms, including factors that determine costs and prices, and real and monetary forces (such as government policies) that affect the national and international economic environment.

Management and Organization

Management and Organization provides an understanding of the processes and structures of organizations through three distinct programs. The Human Resource Management and Organizational Behavior (HRMOB) courses address personnel and industrial-relations topics such as selection, performance appraisal, compensation, and negotiations, as well as behavioral topics such as leadership, motivation, and group dynamics. They

prepare students for managing an organization's human resources effectively. The Organization and Environment (O E) courses examine organization theory, organization design, and management of technology and innovation, as well as the social, political, legal, and ethical environments in which organizations operate. They give students the knowledge, perspective, and analytical tools to deal effectively with organization-environment interactions. The Business Policy (B POL) courses focus on organizational effectiveness from the viewpoint of top management. Emphasis is placed on an integrated view through strategic management and control, planning, decision making, and entrepreneurship.

Management Science

The Department of Management Science consists of three subareas: Information Systems (I S), Operations Management (OPMGT), and Quantitative Methods (QMETH). The Information Systems area focuses on the management of computer-based information systems. The IS curriculum is designed to give students a basic understanding of IS technology and its impact on all phases of an organization. Specific areas of study include telecommunications and network design, systems analysis and design, database management, expert systems, and applications programming. The Operations Management (OPMGT) area of study refers to the functional area of management which produces goods or services in an organization. Specifically, the OPMGT curriculum focuses on the many changes which have occurred in the past ten years in the way that managers think, plan, and operate manufacturing and service facilities. The area includes courses in logistics, quality, inventory and supply-chain management, project management, and waiting lines, among others. The Quantitative Methods (QMETH) area focuses on the theory and application of mathematical and statistical tools in the modeling and analysis of business problems. The QMETH curriculum includes courses in statistics and data analysis as well as courses in operations research (e.g., linear programming, forecasting, using spread-sheets to construct decision support models).

Marketing and International Business

Marketing (MKTG) provides knowledge of concepts and relationships in the areas of consumer behavior, channels of distribution, measurement and analysis of markets, pricing, physical movement of goods, product development, promotion, and sales administration. Marketing careers may involve specialization in Internet marketing, product or brand management, advertising, selling, sales management, marketing research, retailing, wholesaling, and international marketing for a wide spectrum of firms and industries. International Business (I BUS) includes trade, payments, and multinational corporate systems and activities. The area prepares students for international responsibilities in domestic business firms, governmental agencies, and overseas business. Courses in Business Communications (B CMU) stress writing in organizations to accomplish goals, oral reporting, business plan presentation, and the use of computer graphics in communication.

School of Dentistry

Dean
Martha Somerman
D322 Health Sciences

Established in 1945, the University of Washington School of Dentistry offers courses leading to a Doctor of Dental Surgery (D.D.S.) degree, and advanced education leading to a Master of Science in Dentistry degree and/or a certificate of proficiency in endodontics, oral medicine, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Residency training is available in oral and maxillofacial surgery and general practice. The Department of Oral Biology offers a Master of Science (M.S.), an M.S. non-thesis degree for dental hygiene educators, and a doctoral degree (Ph.D.). Postdoctoral study is available in various disciplines. The School also offers a baccalaureate degree completion program in dental hygiene.

Opportunities to earn other degrees concurrently (M.S. or Ph.D. in the School of Dentistry's Department of Oral Biology and other schools) may be arranged on an individual basis.

These educational programs are enriched by the School's strong commitment to research and the presence of a Regional Clinical Dental Research Center, a Comprehensive Center for Oral Health Research, a Dentist-Scientist program, and a fellowship research training programs for predoctoral and postdoctoral students. The mission of the Regional Clinical Dental Research Center is to foster clinically relevant research that will advance dentistry's knowledge base, improve patient care, and promote oral health. The Comprehensive Center for Oral Health Research is focused on children's dental health and is one of only six such programs to be funded nationally by the National Institute of Dental and Craniofacial Research. State-of-the-art clinical research facilities are available for faculty and student use.

School of Dentistry Mission Statement: "The School of Dentistry shares the University's overall mission to generate, disseminate, and preserve knowledge and serve the community. The School is an integral part of the Health Sciences Center and is an oral health-care center of excellence serving the people of the state of Washington and the Pacific Northwest. Our primary mission, through educational, research, and service programs, is to prepare students to be competent oral health-care professionals. The School's research programs contribute to the fundamental understanding of biologic processes and to the behavioral, biomedical, and clinical aspects of oral health. The service mission is to improve the health and well-being of the people of the community and the region through outreach programs that are especially attentive to minority and underserved populations. The School values diversity in its students, staff, faculty, and patient populations. It seeks to foster an environment of mutual respect where objectivity, imaginative inquiry, and the free exchange of ideas can flourish to facilitate personal development, professionalism, and a strong sense of self-worth." (August 2002)

The following departments participate in the curriculum for the School's programs:

- * Dental Public Health Sciences is concerned with the social, legal, political, economic, and psychological aspects of dental health-care delivery as well as the epidemiology of oral diseases and the application of biostatistical methods in studying them.
- * Endodontics offers training in the diagnosis and treatment of diseases and injuries of the tooth pulp and periradicular tissues.
- * Oral and Maxillofacial Surgery trains students in the procedures used for all types of operations in the oral cavity and all phases of dental pain control.
- * Oral Biology encompasses the study of basic biological mechanisms in normal and diseased oral tissues and structures.
- * Oral Medicine provides training in diagnostic techniques and nonsurgical treatments of oral disease.
- * Orthodontics provides training in the prevention and correction of malocclusion of the teeth.
- * Pediatric Dentistry provides students with a broad understanding of prevention, diagnosis, and treatment of most dental needs from infancy through adolescence with emphasis on the psychological and educational requirements of the patient and parent.
- * Periodontics offers training relative to the periodontium and dental implants, with emphasis placed on diagnosis, prevention, treatment, and maintenance.
- * Prosthodontics provides instruction in the fabrication and maintenance of removable, complete, and partial dentures, and dental implants.

- * Restorative Dentistry offers training in the restoration or replacement of tooth structure and study of the form and function of the masticatory structures.

Undergraduate Program

Dental hygiene seeks to understand why some people get preventable oral diseases and why others do not. Risk factors, such as poverty, ethnicity, and education, as well as environment, contribute to perpetuation of these diseases. The dental hygienist observes and defines dental diseases, assesses potential outcomes of interventions, and manages conditions that compromise oral health. As an applied discipline, dental hygiene links its theoretical foundation to behavioral and natural sciences. Using evidence-based science, the discipline seeks to facilitate holistic assessments of individuals and communities and to find solutions to oral health problems. Students in the discipline learn to transfer learning from clinical to community contexts as a means of improving the oral health status among people.

Adviser
D583 Health Sciences, Box 357475
(206) 543-5820
dhyg@u.washington.edu

The Dental Hygiene Degree Completion Program offers the following program of study:

- * Bachelor of Science degree with a major in dental hygiene.

The UW has no prelicensure program in dental hygiene.

Please note: The dental hygiene program is currently undergoing a major revision. Please contact the program for further details.

Bachelor of Science

Suggested First- and Second-Year Courses: Students desiring entry into the dental hygiene profession may take their first year general studies courses in chemistry, psychology, sociology, public speaking, English language composition, mathematics, nutrition, microbiology, and liberal studies at the UW, or another community, technical, or four-year institution. Having successfully completed a pre-licensure dental hygiene program and obtained a license to practice dental hygiene, students are eligible to return to the UW to complete the Bachelor of Science degree with a major in dental hygiene.

Department Admission Requirements

The dental hygiene program is currently undergoing a major revision and is not accepting new applicants. Please contact the program for further information.

Major Requirements

Students must complete University requirements as well as dental hygiene major requirements. University requirements include a 45-credit senior residency; English, writing, and quantitative reasoning proficiencies; and Areas of Knowledge. The dental hygiene major requirements include a sequence of three dental-hygiene core courses and a minimum of one path.

Completion of the required major and University requirements takes one to two years. Students planning to graduate in one year must have a faculty-approved plan of study within the first quarter of enrollment. Students planning a two-year program must have a faculty-approved plan of study within the first two quarters of enrollment. All students must meet with a program adviser yearly and are encouraged to meet with a program adviser quarterly.

Core Requirement

Students complete a year-long core requirement founded on significant oral health problems and probable solutions within the context of specific communities. Behavioral change, community development, health education models, and scientific literature provide a theoretical foundation for study in the core courses. The core curriculum focuses on real problems in real places. Using a people-places-problems approach, students use Internet and library resources to research, analyze, discuss, and make evidence-

based decisions relevant to oral health promotion and dental disease prevention. Further, they explore core values, ethics, laws, and issues related to care access, health promotion/disease prevention approaches, and healthcare delivery models. Included are field activities linked to education, government, business, and health resources. Additionally, dental hygiene majors complete requirements in at least one path and may take electives of their choice to complete the senior residency requirement. All students must complete the three core courses, D HYG 465, D HYG 492, and D HYG 493 (3 credits each, total 9) in the prescribed order.

Path Requirement

Students must select at least one of two pathways to fulfill the path requirement. The options are:

Dental Hygiene Care. This path is for dental hygienists who desire to work as clinicians in hospitals, clinics, long-term care facilities or other healthcare services that require advanced clinical and management skills. Students take courses in interdisciplinary health sciences, along with courses that focus on dental hygiene care and management of persons with physical, mental, developmental, and complex medical disabilities. Required courses in oral medicine augment this path. Major requirements include a minimum of 11 or 12 credits beyond the core: 10 credits in ORALM 460, or approved alternatives that focus on care of special clients; 3 credits of approved interdisciplinary health science courses; and 2 credits of approved research.

Oral Health Promotion. This path is for dental hygienists who desire to work in multicultural and multidisciplinary settings at the local, state, national, or international levels and who require skills beyond clinical expertise. Students learn about the framework within which societies organize and manage their healthcare services and learn to link health with the environment, people's beliefs, ways of life, and kinship. They learn about differences between Western, Eastern and Shamanistic philosophies of health as prerequisites to developing educational strategies for oral health promotion and dental disease prevention. As students build skills essential for working with health agencies, they participate in community health projects as educators, advocates, or researchers. Activities focus on the health of children and families in rural and remote areas of Washington state. Major requirements for this path include a minimum of 15 credits beyond the core, to include 3 credits in approved interdisciplinary health sciences courses, 3 credits in healthcare delivery systems, D HYG 402 or substitute; 3 credits in health promotion strategies (D HYG 403) or approved substitute; and a minimum of 4 credits in at least 2 sections of D HYG 404 or approved substitutes.

Academic Standards

The School of Dentistry requires that a minimum numerical grade of 2.5 be earned in dental hygiene courses counted toward satisfaction of graduation requirements with a dental hygiene major. Graduation with a dental hygiene major also requires a minimum cumulative GPA of 2.00 for all work done in residence at the University. A student whose cumulative GPA falls below 2.00 in any quarter will be placed on academic probation. While on probation, the student must attain at least a 2.50 GPA for each succeeding quarter's work until the cumulative GPA is raised to 2.00.

Student Outcomes and Opportunities

- * **Learning Objectives and Expected Outcomes:** The UW Dental Hygiene Completion Program emphasizes the health of populations rather than of individuals. Dental hygienists conduct community assessments; develop networks that engage community partners; set priorities; obtain baseline measures; set targets; and measure progress toward solutions to community oral health problems. Dental hygiene core skills include the ability to search and retrieve information from the Internet; use census, geographic, and demographic data; critically assess scientific literature; analyze and interpret data; and apply new scientific knowledge to solutions of health problems. In addition to the core knowledge set, dental hygienists select from two paths of study: care of special populations and oral health promotion. Depending upon area of interest, graduates pursue careers as business managers, marketing specialists, clinic administrators, hospital and nursing home dental hygienists, public health planners, program managers, research assistants, and teachers of dental hygiene.
- * **Honors Options Available:** None.
- * **Research, Internships, and Service Learning:** Students in the undergraduate program take off-campus service-learning courses related to their path of study. Generally, sites are located in rural and underserved health provider shortage areas of Washington state, but may include

regional, national, or international locations.

Students are eligible for international programs and exchanges following completion of their core course requirements. An applicant who is a dental hygienist from an affiliated international institution may be eligible for a tuition waiver during one or more quarters of the regular academic year (autumn, winter, spring). Students interested in these opportunities need to contact the program's academic adviser at least six months in advance.

Majors may be eligible, following the completion of prerequisite courses, to participate in study-abroad programs that focus on health care delivery, oral health promotion, or dental disease prevention. The University and its affiliated sites provide the settings for fieldwork, service, and research activities, and interdisciplinary learning experiences.

- * **Department Scholarships:** Students may apply for scholarships offered by the Dental Hygiene Education fund.
- * **Student Organizations/Associations:** The Washington Rural Health Organization, Washington State Public Health Association, Washington State Dental Hygienists' Association, American Dental Education Association, and International Association of Dental Research are among many from which to select.

Of Special Note: The 90-credit community college transfer limit does not apply to students admitted to this program. The last 45 credits for the degree must be earned in residence at the UW.

Graduate Programs

Through their respective departments, the graduate faculty members of the School offer programs leading to the degrees of Master of Science in Dentistry, Master of Science, and Doctor of Philosophy, as well as postgraduate certificate programs.

Master of Science in Dentistry/Postgraduate Certificates

Fields of study for the M.S.D. programs include endodontics, oral pathology, oral medicine and orofacial pain, orthodontics, pediatric dentistry, periodontics, and prosthodontics. Although students may enroll in a graduate certificate program only, students may elect to pursue an M.S.D. The programs are planned to prepare students to think independently, to evaluate their own services and the literature of the programs, and to develop their clinical skills to a level to permit successful clinical practice, teaching, or research in their chosen specialty. Emphasis is placed on the basic principles of diagnosis and treatment. The purpose of the programs is not only to train students in their respective specialties but also to encourage preparation for academic careers or for research. Research may be undertaken in basic or applied science. Opportunities for collaborative research are available with the cooperation of other colleges, schools, or departments of the University.

Postgraduate certificate programs are not administered by the Graduate School, and no thesis is required. The course content may vary somewhat from the M.S.D. program, although the same academic standards are applied in both programs. Tuition and fees are assessed at the graduate level for both programs.

Master of Science in Dentistry

Admission Requirements

- * Either a baccalaureate or a professional degree from a dental or medical school.
- * Completed application and application fee of \$50
- * Three letters of recommendation
- * 200-300 word statement of educational and professional objectives which includes a general area of research interest and academic goals
- * Optional - in addition, a personal statement that addresses the relationship between personal background and aspirations
- * A brief biographical sketch in a resume/CV format
- * Official transcripts, sent directly to the Department of Oral Biology
- * GRE General Test scores
- * TOEFL required for international students. The minimum TOEFL score required for acceptance is 237 computer, 580 paper.

Degree Requirements

- * 50 credits as follows: Required courses: ORALB 564 (1-3, max. 10), ORALB 565 (1-3, max. 10), ORALB 566 (2-4, max. 16), ORALB 569 (2), PERIO 575 (1-3, max. 10), ORALB 570 (1-3, max. 9), ORAL 575 (1-3, max. 10), ORALB 579 (2); either ORALB 591 (1-2, max. 2), ORALB 592 (1-2, max. 2), or DPHS 568 (3); for foreign-trained dentists and non-dentists: ORALB 572 (3), PATH 444 (2/3, max. 5)
- * Recommended electives: DPHS 569 (2), MEBI 520 (2), ORALB 562 (1-5, max. 10), ORALB 574 (3), ORALM 663 (2), PATH 501 (1, max. 9), PATH 535 (*, max. 20), PATH 552 (2-5, max. 30)
- * Research: Fulfilled by either a report on experimentation carried out by the student in one of the laboratories, or a case report with review of the literature. Students interested in a more research-intensive experience should consider enrolling in the M. S. in Oral Biology (thesis) program.
- * Teaching: Students are encouraged to take elective courses offered through the Department of Medical Education and Graduate School.
- * Note: At present, this program is not certified by the American Board of Oral Pathology.

Master of Science, Oral Biology

Admission Requirements

- * Either a baccalaureate or a professional degree from a dental or medical school
- * Completed application and application fee of \$50
- * Three letters of recommendation
- * 200-300 word statement of educational and professional objectives which includes a general area of research interest and academic goals. Optional – a personal statement that addresses the relationship between the student's personal background and aspirations
- * Brief biographical sketch in a resume/CV format
- * Official transcripts, sent directly to the Department of Oral Biology
- * GRE General Test
- * TOEFL required for international students. The minimum TOEFL score required for acceptance is 237 computer, 580 paper.

Degree Requirements

- * Minimum 70 credit hours (including at least nine credits of thesis), of which at least 7 credits must be from science courses outside the Department of Oral Biology. Students who have adequate backgrounds in required courses may, on presentation of appropriate documentation, be excused from required courses; up to six hours of transfer credit may be granted at the discretion of the Graduate School.
- * Required core courses: ORALB 569 (2), ORALB 575 (1-3, max. 10), ORAL 576 (1/2), ORALB 578 (2-4, max. 15), ORALB 579 (2), ORALB 581 (1-3, max. 3), ORALB 591 (1-2, max. 2), ORALB 592 (1-2, max. 2), ORALB 600, ORALB 700, DPHS 568 (3)
- * Electives: 7 credits from science courses outside oral biology
- * Recommended: One class on educational methods
- * Thesis research: A research thesis is required. During the first year, each student is encouraged to spend time in several laboratories to gain familiarity with research in progress and to help identify an area of special interest. Then, a preceptor and thesis advisory committee is appointed and the student begins thesis work. The Final Examination is concerned with the subject matter of the thesis and is conducted as an open seminar followed by examination by the advisory committee.
- * Teaching: Students are encouraged to take elective courses offered through the Department of Medical Education and Graduate School.

Master of Science, Dental Hygiene

Admission Requirements

- * Either a baccalaureate or a professional degree from a dental or medical school
- * Completed application and application fee of \$50
- * Three letters of recommendation
- * 200-300 word statement of educational and professional objectives which includes a general area of research interest and academic goals. Optional – a personal statement that addresses the relationship between the student's personal background and aspirations
- * Brief biographical sketch in a resume/CV format
- * Official transcripts, sent directly to the Department of Oral Biology
- * GRE General Test
- * TOEFL required for international students. The minimum TOEFL score required for acceptance is 237 computer, 580 paper.

Degree Requirements

70 credits, as follows:

- * Coursework: 48 credits, as follows: CONJ 401 (4), CONJ 402 (4), CONJ 403 (4), PATH 444 (2-3, max. 5), PERIO 575 (2), ORALB 520 (3), ORALB 561 (3, max. 6), ORALB 572 (3, max. 6), ORALB 575 (1-3, max. 10); at least one of the following: PERIO 517 (2), DPHS 568 (3), DPHS 569 (2), or O S 532 (2); at least two of the following: ORALM 663 (2), MEBI 520 (2), MEBI 521 (3), GRDSCH 630 (2, max. 6), DHYG 595 (*, max. 12)
- * Electives: 22 credits of electives. Recommended electives: ORALB 569 (2), ORALB 574 (3), ORALB 578 (2-4, max. 15), ORALB 579 (2), ORALB 600 (*), DENT 534 (1, max. 2), DPHS 550 (*, max. 6), DPHS 569 (2), ORTHO 580 (3), O S 520 (2), PHCOL 434 (2), PHCOL 435 (2), ORALM 520 (2)
- * Clinical opportunities may be available in the DECOD (Dental Education in Care of Persons with Disabilities) and the Dental Fears Clinics.

Doctor of Philosophy

Admission Requirements

- * Either a baccalaureate or a professional degree from a dental or medical school
- * Completed application and application fee of \$50
- * Three letters of recommendation
- * 200-300 word statement of educational and professional objectives which includes a general area of research interest and academic goals. Optional – a personal statement that addresses the relationship between the student's personal background and aspirations
- * Brief biographical sketch in a resume/CV format
- * Official transcripts, sent directly to the Department of Oral Biology
- * GRE General Test
- * TOEFL required for international students. The minimum TOEFL score required for acceptance is 237 computer, 580 paper.

Degree Requirements

Minimum 90 credits (including at least 27 credits of thesis). Through coursework, students are expected to gain proficiency in one or more basic biologic sciences and to master modern biological approaches in addition to gaining expertise in the subject area of oral and craniofacial sciences. At least 15 credit hours must come from science courses in departments other than oral biology. These include courses offered through the molecular and cell biology program and courses selected to match the basic science interests of the student. Cross-disciplinary training in bioengineering is also available. All graduate students attend and participate in departmental seminars (ORALB 575).

- * Required core courses: ORALB 569 (2), ORALB 575 (2-4, max. 15), ORALB 576 (1-2), ORALB 578 (2-4, max. 15), ORALB 579 (2), ORALB 581 (1-3, max. 3), ORALB 591 (1-2, max. 2), ORALB 592 (1-2, max. 2), ORALB 600, ORALB 800, DPHS 568 (3)
- * At least 6 credits from the molecular and cell biology program: CONJ 524, CONJ 551 (1.5, 1.5) or PABIO 536 (3).
- * Strongly recommended: at least one class on educational methods

Residency Training

Residency training programs are available in oral and maxillofacial surgery and the general practice of dentistry. Both programs provide for rotation through several of the University-affiliated hospitals. Each is a fully accredited program that grants a certificate upon successful completion of the training. Stipends are provided.

The Oral and Maxillofacial Surgery Program is four years in duration and provides broad exposure to all aspects of the practice of oral and maxillofacial surgery. Application, selection, and administration of this training program is provided through the Department of Oral and Maxillofacial Surgery. Applicants to the program must be graduates of an accredited U.S. or Canadian Dental School, demonstrate proficiency in the English language, submit National Dental Board Examination scores for Part 1, and register and participate in the Postdoctoral Dental Matching Program. Further information can be obtained by contacting the Residency Program Coordinator, Department of Oral and Maxillofacial Surgery, Box 357134, University of Washington, Seattle, WA 98195-7134, 206-543-7722.

The General Practice Residency (GPR) is a one-year training program that emphasizes the general dentist's role in a hospital and the management of

medically, physically, and mentally compromised patients. Application, selection, and administration of the General Practice Residency is provided through the Department of Restorative Dentistry. Further information can be obtained by contacting Dr. Barton S. Johnson, Division of Hospital Dentistry, Department of Restorative Dentistry, Box 357456, School of Dentistry, University of Washington, Seattle, WA 98195-7456; (206) 543-7496; or visit the General Practice Residency Web site.

Postdoctoral Fellowships

Postdoctoral training fellowships are available in behavioral or public-health research in dentistry in addition to those in oral biology. Programs vary in duration and many accommodate degree-seeking or research fellows pursuing an academic career. NIH-sponsored partial tuition and a stipend for up to three years are provided for U.S. citizens, noncitizen nationals, and those foreign nationals with permanent-residency status in the United States. Members of ethnic minorities and women are especially invited to apply. Application, selection, and administration of the program are provided through the Departments of Dental Public Health Sciences and Oral Biology.

Graduate Training in Dental Public Health

Opportunities exist for pursuing graduate degrees in public health which emphasize applications to research in dentistry. Master of Public Health (M.P.H.) programs in the Departments of Epidemiology and Health Services of the School of Public Health and Community Medicine can be pursued in conjunction with postdoctoral training in the School of Dentistry's Department of Dental Public Health Sciences. Didactic course work is taken in the School of Public Health and Community Medicine, augmented with independent study and thesis research on selected topics in the School of Dentistry. Similar opportunities exist for pursuing the Ph.D. in epidemiology or biostatistics with an emphasis on research in dentistry. Further information may be obtained from the Office of Academic Affairs, Box 357480, School of Dentistry, University of Washington, Seattle, WA 98195-7480, (206) 221-6887.

The Office of Continuing Dental Education, School of Dentistry, offers programs and courses throughout the year to provide dentists, auxiliary personnel, and others involved in health care with current scientific knowledge and methodology of patient treatment. Utilizing local, national, and international experts, these programs provide a broad spectrum of information relevant to the needs of dental-health professionals. The instructional program consists of lectures, clinical courses, study clubs, extended clinical training, correspondence, and participation courses, some of which are offered in the new simulated-patient laboratory. Various programs are presented throughout the year in the Pacific Northwest, Alaska, and Hawaii.

A list of courses offered may be obtained from the Office of Continuing Dental Education, Box 357137, University of Washington, School of Dentistry, Seattle, WA 98195-7137, 206-543-5444, www.uwde.org.

Professional Programs

Doctor of Dental Surgery

The Doctor of Dental Surgery (D.D.S.) curriculum provides students with opportunities to learn the fundamental principles significant to the entire body of oral health. Students (approximately 54-56 per class) learn the basic health sciences, attain proficiency in clinical skills, develop an understanding of professional and ethical principles, and develop reasoning and critical decision-making skills that enable implementation of the dental knowledge base. The first year is divided among lecture, laboratory, and preclinical activities in basic sciences, dental anatomy, occlusion, and dental materials. There are also early clinical experiences in preventive dentistry and periodontics. In the second year of the curriculum, students develop additional preclinical skills, learn how basic science principles are applied to the clinical setting, and begin clinical patient treatment in the school's clinics. In the third and fourth years, students primarily concentrate on providing clinical treatment and attend lectures that refine diagnostic and technical skills. Additionally, students are required to participate in elective clinical and didactic courses. Students choose elective courses that are offered by all departments, including opportunities in independent study, research, seminars on various topics, and specialty clinical topics.

The D.D. S. curriculum extends for 42 months or 14 quarters, including two summer quarters. Twelve of the academic year quarters are ten weeks of instruction and one week of examination, while the two required summer

quarters following years two and three are each nine weeks long. If needed, students may be allowed additional time to complete required course work beyond 42 months.

Admission

To be considered for admission to the predoctoral program, a student will need to have completed the required courses listed below, have taken the Dental Admission Test, and have attended a personal interview. The School does not select or give preference to a particular undergraduate major field. The Admissions Committee encourages diversity in majors. Courses in the social sciences and the humanities are also important and are reviewed by the Committee.

The School of Dentistry is a state supported institution and participates in the student exchange program provided by the Western Interstate Commission for Higher Education (WICHE) which supports students from western states without dental schools. Although all applications are carefully reviewed, preference in admission is given to residents of Washington and WICHE states, followed by residents of other states. Required courses are: general chemistry — 2 quarters or 1 semester; organic chemistry — 2 quarters or 1 semester; general biochemistry — 2 quarters or 1 semester; general physics — 3 quarters or 2 semesters; general biology or zoology — 3 quarters or 2 semesters; general microbiology — 2 quarters or 1 semester. The School enrolls a first-year class of 50-55 students.

Transfer Applicants: The School rarely, and only under exceptional circumstances, admits transfer students from other dental schools.

Foreign Applicants: The School does not provide a special program for foreign-trained dentists.

Health Sciences Minority Student Programs: To increase diversity of students, the School participates in and provides funding for the Health Sciences Minority Student Program. In addition to advising and career counseling, this office works with Health Sciences schools to provide student development and support programs, networking opportunities, and summer research programs. The HSMSP Office activities include participation on several Health Sciences and campus-wide committees for purposes of collaborating and exchanging strategies on effective methods for recruiting and retaining a diverse student body, as well as promoting and celebrating diversity.

The School belongs to the American Association of Dental Schools Application Service (AADSAS), the national application service used by most U.S. dental schools. The School has established November 1 as its AADSAS priority filing deadline. This means that only those applications received in the AADSAS Washington, D.C. office by the priority filing date will be forwarded to the University of Washington for consideration by the Admissions Committee. There are no exceptions. AADSAS applications are available online at www.adea.org. Information regarding the Dental Admission Test may be found at <http://www.ada.org/prac/careers/dat-01.html>.

For information on admission to the University of Washington School of Dentistry contact either Kathleen Craig, Office of Student Admissions, School of Dentistry, University of Washington, Box 356365, Seattle, WA 98195-6365, 206-543-5840, fax 206-616-2612, askuwsod@u.washington.edu, www.dental.washington.edu, or Jason Boyd, Pre dental Advising Office, University of Washington, 171 Mary Gates Hall, Box 353760, Seattle, WA 98195-3760.

Once the AADSAS application has been received, a preliminary screening determines if an applicant meets the Admissions Committee's criteria to receive a supplemental application and request for the following materials:

- * A supplementary application which includes a short personal statement
- * A non-refundable application fee of \$35.
- * Three letters of recommendation. Letters of recommendation must include one from a science instructor who can evaluate the applicant's academic and intellectual qualifications, a second from a dentist who is familiar with the applicant's knowledge of and motivation toward the dental profession, and the third (character reference) from someone who can indicate the applicant's contribution to fellow man, community, etc. If a pre dental committee exists on the applicant's campus, a combined recommendation from that committee may be used to replace all three recommendations. The School of Dentistry will accept letters of recommendation processed by AADSAS, or directly from recommenders.
- * Dental Admission Test scores. **Test must be taken by October 31 of the year prior to entry.**
- * Transcripts from all higher education institutions attended.
- * A list of current and future courses.

- * Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the Essential Requirements of Dental Education at the University of Washington School of Dentistry (to be sent with the supplemental application form).
- * Conviction/criminal history information. Washington state law requires that all faculty, students, and staff disclose background information concerning crimes and offenses against vulnerable populations. A complete copy of the law is available from the School's Office of Student Services and will be forwarded upon request. Applications will not be considered until completed disclosure forms have been returned to Student Admissions.

The application will be considered complete once all materials noted above (1-8) are returned. Upon receipt of the completed application, invitations for an interview are sent to applicants based on a preliminary screening of grades, DAT scores, and noncognitive factors. The interview is an opportunity for an open and friendly discussion of the applicant's interests, background, and reasons for selecting dentistry as a profession. The interview allows the applicant to ask questions about the School, faculty, and student life, and is conducted by members of the Admissions Committee. In addition to the interview, the applicant will have an opportunity to hear information about financial aid, meet and have lunch with enrolled students, take a tour of the School, and meet one of the School's deans.

Following the interview, the Admissions Committee, which is composed of faculty and community dentists, will make a decision concerning admission status. The following seven areas are considered in their deliberations:

1. Grades. Overall grade-point average (GPA) and GPA of pre dental required science courses are reviewed. College grades are an important indicator of dental school performance and success. The Committee members review these grades for a strong, consistent GPA without withdrawals, incompletes, repeated courses, or non-graded options. Grade trends are reviewed.
2. DAT (Dental Admission Test). The test, sponsored by the American Dental Association, covers several areas: quantitative reasoning, survey of natural sciences (including biology, general, and organic chemistry), and perceptual ability (including form development, apertures, angles, cubes, and orthographic projections). At the University of Washington the scores are reviewed to identify an applicant's areas of strength. The test must be taken no later than October 31, one year prior to admission.
3. Level of Pre-professional Education. The majority of applicants will have a baccalaureate degree by the time of entry. Admission may be offered to applicants without a baccalaureate degree, but only to those applicants who have completed all pre dental requirements and have an extremely competitive academic record. A minimum of three years' full-time coursework is required.
4. Dental Knowledge. Knowledge of the field of dentistry through experience in a dental setting (dentist's office, clinic, etc.), introductory dental coursework, and exploration of the dental literature are considered as admission factors. A qualified applicant will have a clear understanding of the profession and a demonstrated interest in the field.
5. Contribution to Diversity. Diversity in the student body contributes to the development of oral health care professionals prepared to address the needs of society.
6. Unique Life Experiences. Research and teaching efforts, travel, and work experience are some of the life experiences that are considered important. Such experiences demonstrate the breadth and level of maturity of a candidate.
7. Personal Attributes. In addition to motivation, the applicant's poise and communication skills are examined by the Admissions Committee. Personal attributes such as integrity, responsibility, leadership, initiative, community service, perseverance, and diversity of interests are important.

Although interviews begin in October, the earliest the Admissions Committee will notify applicants of its decision is December 1. The School uses a "rolling admission" format, so interviews and committee decisions will continue to be made between December and March. The Admissions Committee will make one of three decisions regarding all applications:

- * Offer of Acceptance. Admission application has been accepted. The applicant will have a specified time to reply to reserve enrollment in the entering first-year class. In addition, enrollment will be contingent on

timely submission of the following requirements: required registration deposit, transcripts showing completion of all required pre dental courses, registration for autumn quarter of the upcoming academic year, and completion of required immunizations.

- * Alternate Status. Applicant is offered a position on the Alternate List. The applicant will have a specified time to reserve a position on this list which is maintained until the beginning of the school year.
- * Denial of Admission. The Committee has considered the application but cannot offer a position or alternate status.

Accepted applicants will receive follow-up letters and information. Letters detailing registration procedures and providing financial aid information will be sent in early summer. In late summer, new students receive a packet of materials welcoming them to the School and describing the orientation program, also called Prep Weeks. Attendance is mandatory and will provide an opportunity for the newly enrolled student to learn about the upcoming curriculum, student rights and responsibilities, financial aid information, student organizations, and to begin course work. Prep Weeks begin approximately ten days prior to the start of the School of Dentistry's autumn quarter. New students attend an off-campus student retreat to meet classmates and relax in an informal setting.

Western Interstate Commission for Higher Education (WICHE): The School participates in the program administered by WICHE for students who reside in Western states not served by a dental school (Alaska, Arizona, Hawaii, Montana, Nevada, New Mexico, North Dakota, and Wyoming). Such students should seek requests for certification from the WICHE commission office in their state of residence. Students who enroll in the School under the WICHE program pay in-state tuition, the nonresident portion being paid by the member state that sponsors the student.

Information on loans and scholarships may be obtained from the Director of Financial Aid, D322 Health Sciences, Box 356365. Information relating to student life, including the Academic Regulations Manual and Professional Ethics Code may be obtained from the Associate Dean for Student Services, D322 Health Sciences, Box 356365.

Degree Requirements

285-333 credits minimum, as follows:

- * *Year 1 (68 credits, plus electives):* B STR 431 (2), B STR 530 (13), B STR 541 (4); DENT 610 (2); DPHS 510 (2); ORALB 510 (3, 3), ORALB 520 (3); ORALM 513, ORALM 514, ORALM 515 (1, 1, 1); ORALM 516, ORALM 517 (1, 2); P BIO 405; P BIO 406 (4, 4); PATH 444 (2, 3); PERIO 517 (2); RES D 510 (1, 2), RES D 511 (3), RES D 515 (3), RES D 516 (3), RES D 517 (3), RES D 519 (1)
- * *Year 2 (87 credits, plus electives):* DENT 520 (1); DENT 521, DENT 522 (3, 3); DENT 523 (1); ENDO 521 (4); O S 520 (2); ORALB 521 (2); ORALM 520 (2, 2, 2), ORALM 525 (1), ORALM 526 (2), ORALM 527 (1), ORALM 528 (1), ORALM 529 (4); ORTHO 520 (2), ORTHO 521 (3), ORTHO 522 (2); PEDO 520 (4), PEDO 525 (1); PERIO 525, PERIO 526 (2, 2); PERIO 620 (1); PHCOL 434 (2), PHCOL 435 (2); PROS 520 (3), PROS 521 (1), PROS 523 (2), PROS 525 (4), PROS 620 (3, 1); RES D 520, RES D 521, RES D 522 (3, 3, 3); RES D 525, RES D 526, RES D 527 (3, 3, 3); RES D 620 (3)
- * *Year 3 (74 credits, plus electives):* DENT 533 (2), DENT 534 (1, 1), DENT 537 (1), DENT 543 (1); DENT 551, DENT 552, DENT 553, DENT 554 (1, 1, 1, 1); DPHS 535 (1), ENDO 534 (1), ENDO 535 (1), ENDO 630 (1, 1, 1, 1); O S 530 (1, 1, 1), O S 532 (2), O S 630 (2, 2); ORALM 531, ORALM 532, ORALM 533 (1, 1, 2); ORALM 630 (1, 1, 1, 2); ORTHO 630 (1); ORTHO 631 (1); PEDO 630 (1, 1, 1, 1); PERIO 530, PERIO 531 (2, 2); PERIO 630, PERIO 631, PERIO 632 (1, 1, 1); PERIO 639 (1); PROS 630 (1, 1, 1, 2); RES D 530, RES D 531, RES D 532 (2, 2, 2); RES D 535 (3), RES D 630 (2, 3, 3), RES D 635 (3)
- * *Year 4 (54 credits, plus electives):* DENT 547, DENT 548, DENT 549 (2, 2, 2); DENT 555, DENT 556, DENT 557 (1, 1, 1); DENT 640 (2), DENT 645 (2); DPHS 541 (1), DPHS 640 (1); ENDO 630 (1, 1, 1); O S 630 (2); ORALB 540 (2); ORALM 540 (2, 2), ORALM 545 (1, 1), ORALM 640 (1, 1, 1); PEDO 630 (1, 1, 1); PERIO 540 (1); PERIO 640, PERIO 641, PERIO 642 (1, 1, 1); PROS 640 (1, 1, 1); RES D 540 (2), RES D 541 (2), RES D 542 (1), RES D 640 (3, 3, 3)
- * *Electives:* A minimum of two elective courses must be taken during the course of the program. Elective credits may not exceed a total of 50 credits.

Facilities

School clinics, teaching laboratories, and lecture halls are up-to-date, well maintained, and periodically renovated. Clinical modules are assigned to students for use in patient treatment. The D-1 Simulation is a state-of-the-art teaching facility used for preclinical and laboratory courses.

School Accreditation and Licensure

The School is fully accredited by the Commission on Dental Accreditation, the recognized accrediting body for dentistry and the related dental fields. For information, write to the Commission on Dental Accreditation, 211 East Chicago Ave., Chicago, IL 60611-2678. Admission to the practice of dentistry in any state is conditional upon meeting the requirements of the individual state dental licensure requirement. In order to practice in the State of Washington, the candidate for licensure must have a dental degree from a U.S. or Canadian dental school, and have successfully completed the American Dental Association National Board Examinations and the Western Regional Examining Board Examination. Additional information

about licensure requirements should be requested from the Washington State Department of Health, Dental Quality Assurance Commission, PO Box 1099, Olympia WA 98504-1099, 360- 586-6898.

Health Care and Immunization Policy

Enrolled students at the University of Washington School of Dentistry are entitled to limited outpatient basic health care at the Hall Health Primary Care Center. There are additional fees associated with this care. This care does not cover spouses and dependants. In addition, the University has arranged for an Accident and Sickness Insurance Plan specifically designed for students, their dependants, and their domestic partners.

Course Descriptions

See page 468.

College of Education

Dean

Patricia Wasley
222 Miller

Associate Deans

Stephen T. Kerr
Deborah E. McCutchen

The College of Education is a graduate and professional school dedicated to equity and excellence in education through the preparation and on-going renewal of education professionals, the promotion of social justice, the advancement of knowledge through research, and the connection of research to inform policy and improve practice. The College has four broad curricular areas: Curriculum and Instruction, Educational Leadership and Policy Studies, Educational Psychology, and Special Education. Degrees conferred are M.Ed., Ph.D., Ed.D., and M.I.T. Certificates can be earned in teaching (elementary, secondary, and special education), school administration (principals, program administrators, and superintendents), and school psychology.

The College of Education at the University of Washington believes that an effective public education system for a diverse citizenry is the cornerstone of a democratic society. To that end, the College dedicates its resources to helping make an excellent education an everyday reality for every student in every community across the state and country. As part of a major university located in a metropolitan area, the College is able to work in collaboration with a number of school districts in the area to provide teaching, research, and field experiences for its students.

Special Offices and Services

The College of Education maintains a number of specialized offices to assist in the fulfillment of its goals. Among these are the Office of Teacher Education, the Office of Admissions and Academic Support, and the Office of Minority Recruitment and Retention. In addition, the College of Education maintains formal relationships with a number of school districts in the area to provide research and field experience opportunities for students in the various programs. Individuals interested in teacher certification or in graduate degree programs may visit the College's Web site at www.educ.washington.edu or email edinfo@u.washington.edu.

Undergraduate Study

Undergraduate students can choose from courses offered to help them explore the field of education and prepare for graduate study. Students should visit the College Web site and contact the Office of Admissions and Academic Support to discuss their goals with a program-design specialist. Courses that provide field work in local schools or social service agencies give students the opportunities to make informed career and academic choices. Students may complete prerequisites for graduate programs through undergraduate work. In cooperation with academic departments, requirements to meet endorsement (subject) guidelines for secondary teaching may be completed as an undergraduate. Students should plan their coursework as early as possible during their undergraduate study.

Professional Certification

The College of Education is authorized by the State Board of Education to offer professional certificate programs in education for administrators, educational staff associates, and teachers. Program-design specialists are available to help with pre-program counseling, long-range planning, applications, registration, referrals to other campus resources, general program advising, and continuing/professional certificate requirements.

Administrator Certificates

Administrator Certificate preparation programs for superintendents, principals, and program administrators are offered through the College of Education. The following Web sites contain specific information about admissions, curriculum, faculty, and general advising:

For principals and program administrators, the Danforth Educational Leadership Program, depts.washington.edu/k12admin/principal.html.

For superintendents, the Leadership for Learning Program, depts.washington.edu/k12admin/superintendent.html.

Educational Staff Associate Certificates

Educational Staff Associate Certificate preparation programs are offered for the school psychologist and school social worker. Information concerning requirements and admission may be obtained as follows: school psychologist -- Area of Educational Psychology, 312 Miller, Box 353600, University of Washington, Seattle, Washington 98195-3600; school social worker -- School of Social Work, Box 354900, University of Washington, Seattle, Washington 98195-4900.

The College of Education is authorized by the State Board of Education to prepare and recommend individuals for Residency and Professional Teaching Certificates. The Teacher Education Program is accredited by the National Council for Accreditation of Teacher Education. Graduates are qualified for certification in all states party to the Interstate Certification Compact and in other states as well. Title II of the Higher Education Act requires institutions of higher education and states that approve such programs to develop and publish an annual report on their teacher preparation programs. The University of Washington report may be viewed on the Web at www.educ.washington.edu/COEWebSite/pdf/Title2.pdf, or requested via email from edinfo@u.washington.edu.

Residency Teaching Certification Program

The College of Education offers residency teaching certification for individuals desiring careers as elementary or middle/secondary school teachers, or as special education teachers working with students with severe disabilities or emotional and behavioral disorders, and with infants, toddlers, and preschool children with disabilities. Candidates may also select a teacher education/special education option which provides initial certification in elementary education with course work in special education. All programs are offered at the master's level. For additional information, email edinfo@u.washington.edu, or visit the College's Web site at www.educ.washington.edu.

An undergraduate or postbaccalaureate program leading to certification in music education, grades K-12, is offered through the School of Music. For additional information contact the School of Music Advising Office, 116 Music, Box 353450, University of Washington, Seattle, WA 98195-3450.

Professional Teaching Certificates

For information on the OSPI guidelines and where programs exist, contact any Educational Service District or the Office of Professional Licensing and Certification, OSPI, Box 47200, Old Capitol Building, Olympia, Washington 98504, or visit www.k12.wa.us/cert/. For information about Professional Teacher Certificate programs at the University, contact Center Connect at 206-543-7834.

Endorsements on Teaching Certificates

Teachers holding an initial/residency or continuing/ professional teaching certificate may add endorsements to their certificates which will qualify them to teach additional subjects. Information on endorsement requirements is available on the Web at www.educ.washington.edu/COEWebSite/research/profdev/endorse.htm, or contact the Office of Admissions and Academic Support, 211 Miller, Seattle, WA 98195-3600, or email edinfo@u.washington.edu.

Graduate Degree Programs

Graduate Program Coordinator
206 Miller, Box 353600
206-543-7833
edinfo@u.washington.edu

The College of Education currently offers four advanced degrees: Master in Teaching, Master of Education, Doctor of Education, and Doctor of Philosophy. The M.I.T. degree will be awarded to elementary and secondary certification students at the completion of their program. Graduate students working toward other degrees may specialize their degree studies in curriculum and instruction, educational psychology (including cognitive studies), educational leadership and policy studies, or special education. A focus on higher education leadership and policy leading to Master of Education or Doctor of Education degrees is offered through Educational Leadership and Policy Studies. Questions regarding graduate study in

education should be directed via email to edinfo@u.washington.edu, or visit the College's Web site at www.educ.washington.edu.

Master in Teaching

The Master in Teaching (M.I.T.) degree program results in a Washington residency teaching certificate for elementary or secondary (specific subjects) school teaching. The program is an integrated sequence of full-time, daytime course work and field experiences spanning five quarters. One quarter is devoted to full-time placement in a school. Field experiences are in schools in the Seattle/Puget Sound area chosen to provide a variety of situations in regard to level, school population, and location.

Admission Requirements

- * A baccalaureate degree from an accredited institution with at least a 3.0 GPA for the last 90 quarter (60 semester) credits.
- * Goal statement
- * Gain 60 or more hours in a classroom that most closely matches the subject and age level the applicant wishes to teach. Have supervisor complete the Evaluation of Educational Experience form.
- * Two letters of recommendation from faculty or professional references.
- * Send passing scores from all three sections of the West-B exam scores to UW.
- * Complete and gain a passing score of the Praxis II exam in applicant's specific content area. Refer to Web or brochure for specific information.
- * Official transcripts from all community colleges and universities attended.
- * Secondary applicants must contact the appropriate department advisor to get their coursework evaluated using the Endorsement Evaluation form. Please refer to the Endorsement sheet in the MIT packet for department information and locations. Social Studies applicants may drop off unofficial transcripts and course descriptions to 206 Miller for evaluation.
- * Elementary applicants must have coursework evaluated by a Program Design Specialist in 206 Miller. This is done by submitting transcripts (and course descriptions from schools other than UW) along with the Prerequisite Evaluation form to 206 Miller. The evaluation will be completed within 2 weeks and mailed to the applicant.

Degree Requirements

60-101 credits, as follows:

- * *Elementary Education Focus:*
 - o Courses: EDC&I 324 (2); EDC&I 494 (1); EDC&I 586 (1, 1, 1); EDLPS 496 (3); EDSPE 526 (3); EDTEP 501, EDTEP 502, EDTEP 503 (2, 3, 4); EDTEP 505 (2); EDTEP 511 (3); EDTEP 521, EDTEP 522 (3, 3); EDTEP 523 (3); EDTEP 531, EDTEP 532, EDTEP 533 (3, 3, 3); EDTEP 541 (4); EDTEP 542 (3); EDTEP 543 (3); EDTEP 551 (3); EDTEP 552 (3); EDTEP 601 (10); UCONJ 510 (4).
 - o Note: The current Washington state endorsement for elementary teachers is "elementary education." Graduates of this program may be hired to teach specific or multiple subjects in middle or junior high school through grade 8. Those interested in teaching in the middle schools are encouraged to discuss this option with advisers in the Office of Student Services.
- * *Elementary Special Education Focus:* EDC&I 324 (2); EDC&I 494 (1); EDC&I 586 (1, 1, 1); EDLPS 496 (3); EDSPE 404 (3); EDSPE 414 (3); EDSPE 496 (3); EDSPE 496 (3); EDSPE 500 (3); EDSPE 513 (3); EDSPE 514 (3); EDSPE 526 (3); EDSPE 545 (3); EDSPE 601 (3); EDTEP 501, EDTEP 502, EDTEP 503 (2, 3, 4); EDTEP 505 (2); EDTEP 511 (3); EDTEP 521, EDTEP 522 (3, 3); EDTEP 523 (3); EDTEP 531, EDTEP 532, EDTEP 533 (3, 3, 3); EDTEP 541 (4); EDTEP 542 (3); EDTEP 543 (3); EDTEP 551 (3); EDTEP 552 (3); EDTEP 601 (10); UCONJ 510 (4).
- * *Secondary Education Focus:* EDC&I 494 (1); EDC&I 586 (1); EDTEP 551 (3); EDTEP 561 (5); EDTEP 562, EDTEP 563 (3, 3); EDTEP 564 (3); EDTEP 565 (3); EDTEP 571 (3); EDTEP 573 (3); either EDTEP 580, EDTEP 582, EDTEP 584, EDTEP 586, or EDTEP 588 (5); either EDTEP 581, EDTEP 583, EDTEP 585, EDTEP 587, EDTEP 589 (3); EDTEP 591 (3); EDTEP 592 (3); EDTEP 593 (3); EDTEP 595 (3); EDTEP 601 (10); elective outside Education (2)

Master of Education

The Master of Education (M.Ed.) degree requires a minimum of 45 credits, including at least 15 credits in a specialized area of study in education; 9 credits related to, but outside of, the specialization, some course work outside education; 9 thesis credits or, for the non-thesis option, 9 credits in a field study or other approved project; and a final examination.

Admission Requirements

- * A baccalaureate degree from an accredited institution with at least a 3.0 GPA for the last 90-quarter (60 semester) credits.
- * GRE Scores
- * Goal statement
- * Prerequisites stipulated by the area of specialization within the College

Degree Requirements, Curriculum and Instruction Pathway

45 credits, as follows:

- * Common Area requirements
 - o Foundations of Education (9 credits): Students should gain an understanding of the complex issues that influence teaching and learning. Students work with advisors to select from courses such as: history of education, education as a moral endeavor, human learning, curriculum design, special topics in curriculum and instruction..
 - o Thesis, non-thesis, or project option (9 credits): The non-thesis option may be satisfied by a 9 credit culminating project or 9 credits at the 500 level or above related to the student's teaching and research interests.
 - o Colloquium Presentation: At the end of the program, students are required to present their work at the Curriculum and Instruction colloquium. For this, students prepare a visual representation of their work (usually a poster). During the colloquium, students are expected to talk to faculty and students about and answer questions about their thesis, project, or other work conducted during the program. In addition, students are required to attend one other colloquium prior to presenting.
- * *Educational Communication and Technology Study Option:*
 - o Required courses (9 credits minimum): EDC&I 510 (3), EDC&I 511 (3); either EDC&I 551 (3), EDC&I 552 (3), or EDC&I 553 (3)
 - o Related courses (6 credits minimum): Courses on the design, development, and use of instructional systems, materials, and approaches in a variety of educational settings, chosen in consultation with adviser.
 - o Courses outside Curriculum and Instruction (3-12 credits): These courses are to be selected with the student's adviser. They may include courses from any other Area in the College and from departments across the University. At least 3 credits must be taken outside the College.
 - o Additional foundations courses (3-6 credits): Students may take additional Foundations courses, to be chosen from the following categories with the approval of the adviser: psychological foundations, educational policy studies, research foundations, or curriculum foundations.
- * *Language, Literacy, and Culture Study Option:*
 - o Core studies (9 credits): 9 credits from the following: EDC&I 453 (3), EDC&I 455 (3), EDC&I 457 (3), EDC&I 460 (3), EDC&I 462 (3)
 - o Assessment and inquiry (3 credits): All students must, in consultation with their adviser, select one course that focuses on issues of assessment and inquiry
 - o Concentrations (15 credits): Literacy specialists, in consultation with their advisers select a minimum of three courses in the Literacy strand and a minimum of one course in each of the other strands. ESL specialists, in consultation with their advisers select a minimum of three courses in ESL and a minimum of one course in each of the other strand.
- * *Mathematics Education Study Option:*
 - o At least 27 credits in Mathematics and Mathematics Education. Courses should be selected in consultation with the student's advisor and be appropriate for future career goals. Of the 27 credits, 9 credits should be chosen from Mathematics Education courses (below).
 - o Mathematics Education Courses: EDC&I 475 (3), EDC&I 476 (5), EDC&I 477 (5), EDC&I 478 (2-9), EDC&I 479 (1-6), EDC&I 575 (3), EDC&I 576 (3), EDC&I 577 (1-6).
- * *Multicultural Education Study Option:*
 - o Ethnic Diversity Outside the College of Education (15 credits): 15 credit hours in ethnic diversity subject matter fields outside of the College of Education. Courses can be taken from those offered by various departments in the College of Arts and Sciences. All course choices are to be negotiated with advisers.
 - o Multicultural Education (15 credits): EDC&I 424 (3), EDC&I 569 (4); remainder of courses to be chosen from the following: EDC&I 456 (1-6); EDC&I 464 (3); EDC&I 469 (3); EDC&I 474 (3); EDPSY 536 (3); EDLPS 566 (3); EDC&I 573 (3); EDC&I 574 (3).

- * *Science Education Study Option:* The student selects, with the approval of the faculty supervisor, at least 21 credits in fields such as, biology, chemistry, physics, earth science, oceanography, or other science-related courses.
 - * *Social Studies Education Study Option:* 12-15 credits of core social studies courses, to be negotiated with adviser. 15-21 credits of history/social science courses related to teaching interests, or additional educational courses.
 - * *Teaching and Curriculum Study Option:* 27 credits, including 9-18 credits of required study in teaching and curriculum, to be chosen in consultation with adviser.
- o Biologic Bases of Behavior (5 credits): EDPSY 577 (5)
 - o Specialization Seminars (7 credits minimum): EDPSY 549 (3), EDPSY 568 (3), EDPSY 570 (2), EDPSY 568 (3), EDPSY 549 (3)
 - o Individual Differences and Personality (5 credits minimum): EDPSY 548 (5), PSYCH 405 (5)
 - o Assessment (16 credits minimum): EDPSY 507 (5), EDPSY 564 (5), EDPSY 540 (5), EDPSY 572 (3), EDPSY 573 (3)
 - o Intervention (12 credits minimum): EDPSY 544 (5), EDPSY 546 (5), EDPSY 550 (3), EDPSY 551 (3)
- * *Note:* At least one course relevant to the student's field of study must be taken from a unit other than the College.
 - * *Certification:* The Washington State approved internship program at the University of Washington is open only to graduate students who have successfully completed the masters program in School Psychology at the University of Washington and are currently matriculated as full time students at the post-masters or doctoral levels. Washington State Certification is awarded by successfully passing the Praxis Exam and by successfully completing a 9-month internship of 1200 hours or more (half of which must be in a school setting) and 6 credit hours of university case study supervision and 30 hours of internship credit. Students who successfully complete the internship may also apply for National Certification as a school psychologist.

Degree Requirements, Educational Psychology

50 credits, as follows:

- * *General Requirements:*
 - o Completion of an approved program of a minimum of 50 quarter credits, exclusive of prerequisites.
 - o Written or oral examination upon completion of coursework.
 - o Research: two options are available, thesis, or non-thesis. The thesis option requires the design and accomplishment of an empirical study. The non-thesis option requires the preparation of a scholarly paper of publishable quality. (9 credits minimum)
- * *Foundations of Education courses (12 credits):* either EDLPS 521 (3), EDLPS (3), EDLPS 540 (3), or EDPSY 580 (3); either EDPSY 501 (3) or EDPSY 510 (3); EDPSY 490 (3); EDPSY 591 (3)
- * *Measurement, Statistics, and Research Design Study Option:*
 - o Required courses: One or more courses from each of the following content fields with course options to consist of courses listed below or alternative courses (including courses outside of Education) approved by the faculty adviser.
 - + Measurement and Evaluation: EDPSY 495 (3), EDPSY 512 (3), EDPSY 584 (3), EDPSY 592 (3), EDPSY 595 (3), EDPSY 596 (3), EDPSY 597 (3)
 - + Human Development: EDPSY 502 (3), EDPSY 531 (3), EDPSY 532 (3), EDPSY 582 (3)
 - + Cognition and Learning: EDPSY 510 (3), EDPSY 524 (3), EDPSY 525 (3), EDPSY 583 (3), PSYCH 414 (5)
 - + Language Processes: EDPSY 520 (3), EDPSY 521 (3)
 - o Research (9 credits): Thesis option: The M.Ed. thesis is a report of a research investigation that requires the student to design and execute an empirical study. Non-thesis option: The non-thesis option requires preparation of a scholarly review of the research literature and should be of publishable quality.
- * *Human Development and Cognition Design Study Option:*
 - o Required courses: One or more courses from each of the following content fields with course options to consist of courses listed below or alternative courses (including courses outside of the College) approved by the faculty adviser:
 - + Human Development: EDPSY 502 (3), EDPSY 509 (5), EDPSY 531 (3), EDPSY 532 (3), EDPSY 533 (3), EDPSY 534 (3), EDPSY 582 (3)
 - + Cognition and Learning: EDPSY 510 (3), EDPSY 524 (3), EDPSY 525 (3), EDPSY 583 (3), PSYCH 414 (5)
 - + Reading and Language Processes: EDPSY 425 (3), EDPSY 507 (5), EDPSY 520 (3), EDPSY 521 (3), EDC&I 532 (3), PSYCH 447/LING 447 (4), PSYCH 457/LING 457 (5), ENGL 472 (5)
 - + Measurement and Evaluation: EDPSY 495 (3), EDPSY 512 (3), EDPSY 513 (3), EDPSY 584 (3), EDPSY 592 (3), EDPSY 595 (3), EDPSY 596 (3), EDPSY 597 (3)
 - o Research (9 credits): Thesis option: The M.Ed. thesis is a report of a research investigation that requires the student to design and execute an empirical study. Non-thesis option: The non-thesis option requires preparation of a scholarly review of the research literature and should be of publishable quality.
- * *School Psychology Specialization:*
 - o Statistics and Research (6 credits): EDPSY 490 (3), EDPSY 591 (3)
 - o Cognition and Learning (3 credits minimum): EDPSY 501 (3); if the student does not possess a teaching certificate, EDPSY 500 (3) is required
 - o Social and Developmental Bases of Behavior (6 credits minimum): EDPSY 502 (3), EDPSY 531 (3), EDPSY 532 (3)
 - o Exceptionality (6 credits minimum): EDPSY 515 (3), EDSPE 520 (3), EDSPE 526 (3), PSYCH 410 (5)

Degree Requirements, Education Leadership and Policy Studies

48 credits, as follows:

- * Common area and distribution requirements (18 credits minimum): A minimum of 18 credits of coursework in EDLPS. Of these 18 credits, 12 credits are distributed as follows:
 - o Social and Cultural Foundations, 6 credits minimum
 - o Organizations and Policy, 6 credits
- * Specialization requirement (9 credits minimum): In conjunction with the adviser, students develop an area of specialization.
- * Breadth requirement (6 credits minimum):
 - o At least 3 credits in one or more other areas in the College of Education (EDC&I, EDPSY and/or EDSPE)
 - o At least 3 credits outside the College of Education.
- * Research/inquiry requirement (6 credits minimum):
 - o At least 3 credits in basic statistics (EDPSY 490 or the equivalent).
 - o At least 3 credits in research/inquiry methods (e.g., EDPSY 588, EDPSY 591, EDLPS 524, EDLPS 535, EDLPS 543, EDLPS 568, or the equivalent)
- * Completion of thesis or non-thesis option (9 credits minimum)
- * Specific courses are determined in consultation with the adviser

Degree Requirements, Special Education

48 credits, as follows:

- * Foundations of Education (6 credits): A minimum of 6 credits in courses in or out of the College of Education, or the equivalent as determined in consultation with the adviser.
- * Special Education Major Field (21 credits): The specific sequence of courses is determined by the adviser, depending on the student's background, educational goals, and type of disabled individual that the student wishes to teach.
- * Assessment and Research Methodology (9 credits): In order to develop competency in assessment of learners with disabilities and to become familiar with research tools, a minimum of 9 credits, selected from coursework in assessment and/or research methodology are determined in consultation with the adviser.
- * Special Assignments in Special Education (12 credits minimum): A minimum of 12 credits divided among at least two of the following options: EDSPE 500 (1-6, max. 6), EDSPE 600, EDSPE 601 (3-9, max. 9), EDSPE 700 (max. 9). Students entering an Ed.D or Ph.D. program should select a thesis option.

Doctor of Education

The Doctor of Education (Ed.D.) degree is designed to prepare professionals whose primary interest is to deal directly with problems of educational practice. The program of study leading to the Ed.D., as a professional degree, focuses on the utilization of research and practitioners' knowledge, rather than on the production of research knowledge.

This professional degree requires at least two years of resident study, a program of specialized study with credit in education and related fields,

sufficient preparation in research methodology to interpret research findings for use in practice, an internship and leadership training, a General Examination, a dissertation on a problem of educational practice, and a Final Examination.

Admission Requirements

- * Graduate Record Exam (GRE) scores
- * Master's degree or equivalent from an accredited institution
- * Minimum grade point average of 3.00 from the most recent 90 (60 semester) credits
- * Transcripts (sealed) from each college or university attended.
- * Goal statement
- * Three letters of recommendation
- * Resume/curriculum vita
- * Writing sample(s)
- * Interviews
- * Specific programs may have additional admission requirements. Please visit the Web site or contact the program for further information.

Degree Requirements

102 credits, as follows:

- * Educational Specialization (24 credits):
 - o Courses in one specialty within the area of specialization designed to provide student with knowledge of the field: 9 credits
 - o Courses in the General Area or in the student's special interests within the Area of Specialization other than those selected to fulfill the 9 credits above: 15 credits
- * Related Field(s) (24 credits): Courses selected from within education (minimum of 12 credits) or outside of education which complement the student's educational specialization and include multidisciplinary learning experiences.
- * Research/Evaluation Preparation (9 credits): Courses selected to enhance a student's ability to conduct field-based research/evaluation studies.
- * Leadership Training (9 credits): EDLPS 520 (3), EDLPS 550 (3), EDLPS 560 (3)
- * Supervised Internships and Field Experiences (9 credits): The internships and field experiences are designed to work in education and the related field(s), and to conduct field-based research and evaluation studies.
- * Dissertation (27 credits)

Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) in education is a research degree. It offers preparation for a career of research on issues fundamental to education -- issues that range from fairly narrow questions about human learning to macroquestions regarding the form of societies' educational institutions. The scope of the Ph.D. degree in education is broad. It is possible to pursue a degree organized around traditional study areas such as educational psychology, curriculum and instruction, special education, or educational leadership and policy. A student may develop a course of study that integrates various elements of more than one study area (e.g., multiethnic education and literacy). One of the study options in the Ph.D. program is school psychology, which prepares students for the professional practice of psychology with school-age children, as well as for research.

Admission Requirements

- * Graduate Record Exam (GRE) scores
- * Master's degree or equivalent from an accredited institution
- * Minimum grade point average of 3.00 from the most recent 90 (60 semester) credits
- * Transcripts (sealed) from each college or university attended.
- * Goal statement
- * Three letters of recommendation
- * Resume/curriculum vita
- * Writing sample(s)
- * Interviews

Degree Requirements

The course of study consists of six academic areas and the dissertation. The Ph.D. is specialized and highly individualized. Especially in a broad field like education, it is impossible to specify a single group of courses that should be taken by all Ph.D. students. Although the department has a limited number of required courses for the Ph.D., it does require that

students demonstrate in-depth knowledge of education and selected related fields. For most students, this means studying in a broad area, a specialization within that area, two cognates and a specialization outside of the department.

Degree requirements include a minimum of two years of resident study, a program of specialized study with credits both in education and in other academic units, preparation in research methodology adequate to design and assess research in the field of specialization, sufficient study in cognate fields inside and outside of education to ensure that the candidate can place the specialized research in a broader context, a General Examination, a research dissertation, and a Final Examination.

Accreditation

Within the College of Education, a number of degree programs have formal accreditation. The School Psychology Ph.D. program is accredited by the American Psychological Association (APA) and approved by the National Association of School Psychologists (NASP). The School Psychology M.Ed. program is also accredited by NASP and the Washington State Board of Education for Initial Residency and Continuing/Professional teaching Certificates and Initial/Residency certification. Graduates qualify for certification in all states party to the Interstate Certification Compact.

Financial Aid

The College of Education offers a limited number of awards with varying stipends for graduate students in education. Primary consideration is given to doctoral students with a background of successful teaching or administrative experience. Specific information on the various types of remunerative appointments for graduate students in education, amounts of stipends, and application procedures may be obtained via email at edinfo@u.washington.edu or via the College's Web page at www.educ.washington.edu. The annual application deadline is March 1.

Special Research and Service Facilities

Within the College of Education opportunities exist for students to gain research and service experience.

The Center for Multicultural Education focuses on research projects and activities designed to improve practices related to equity issues, intergroup relations, and the achievement of students of color. Visit the center's Web page at depts.washington.edu/centerme/home.htm.

The Clinical Training Laboratory, operating under the aegis of Educational Psychology, offers observation rooms equipped with video recorders where counseling and psychology trainees and clients can be observed and taped through one-way mirrors.

The world-renowned Experimental Education Unit offers an interdisciplinary approach to research, training, and service, providing integrated classes for 150-200 young children, toddlers, and infants with disabilities and their typically developing peers, and services for their families. Learn more about the EEU by visiting depts.washington.edu/eeuweb/.

The Multidisciplinary Learning Disabilities Center conducts research on preventing and treating reading and writing disabilities and on the biological basis of learning disabilities. The center disseminates its findings to teachers through workshops and presentations at regional, national, and international meetings, and at a unique teacher mentoring program during the summer program for students with dyslexia and dysgraphia.

The Write Stuff investigates interventions for preventing and treating writing disabilities.

The National Center for the Study of Teaching and Policy, a consortium of five universities headed by the University of Washington, conducts a wide range of studies aimed at local, state, and national policy strategies to promote teacher excellence. For more information, visit the center's Web page at www.ctpweb.edu, or email ctpmail@u.washington.edu. For more information, visit the center's Web page at www.ctpweb.edu, or email ctpmail@u.washington.edu.

The Institute for the Study of Educational Policy promotes interdisciplinary studies that bring together research and practice for the benefit of children and youth, educators, policy makers, and the larger community. The institute includes (a) The Center for Educational Renewal, which responds to a growing nationwide interest in the renewal of schools and teacher education by creating partnerships, promoting innovative programs and

policies for the education of educators, and reforming leadership and governance structures; (b) The Center for Effective Schools, which is committed to engaging in research and service activities designed to promote instructionally effective schools through collaboration and self-evaluation; (c) The Center for the Study and Teaching of At-Risk Students, which was established to foster interprofessional projects to encourage students to stay in school; and (d) The School Law Division, which deals with the improvement of professional practices of school administrators, including superintendents, principals, and program directors. Additionally,

the institute conducts policy research pursuant to grants and contracts with school districts, state and federal agencies, and other educational organizations.

Course Descriptions

See page 478.

College of Engineering

Dean

Matthew O'Donnell
371 Loew

Associate Deans

Mary E. Lidstrom, New Initiatives
Chen-Ching Liu, Organizational Infrastructure

Engineering is the science and art of applying scientific and mathematical principles, experience, judgment, and common sense to design devices and systems that benefit society. Engineers are fascinated by questions of how and why things work. They use their training in mathematics, physics, and chemistry to understand the physical world and develop creative solutions to society's complex needs. Engineers may be designers, planners, managers, analysts, researchers, consultants, sales specialists, and more. Engineering graduates have many career possibilities open to them.

The primary goal of the College of Engineering educational programs is to prepare students for a professional career in engineering by providing the technical foundation required for success in industry, government, or academia. Other goals of the College are to instill within its students the highest ethical standards, the capability for lifelong learning, and a curiosity about the world. Excellence in undergraduate and graduate academic programs remains the College's highest priority.

For undergraduates, the College of Engineering offers a flexible curriculum that not only accommodates varied student needs, both in established departmental programs and interdisciplinary studies, but also culminates in a major and meaningful design experience. (See Interdisciplinary Engineering Studies Program for interdisciplinary undergraduate and graduate programs.)

For graduate students, the College of Engineering offers Master's and Doctoral programs in aeronautics and astronautics, bioengineering, chemical, civil and environmental, computer, electrical, industrial, materials science, mechanical, and technical communication.

The College offers active educational and research programs, both departmental and interdisciplinary, at the graduate levels. (See Interdisciplinary Engineering Studies Program for interdisciplinary undergraduate and graduate programs.)

The College of Engineering has been a major unit of the University since 1899. The first engineering degrees were authorized in mining engineering and metallurgical engineering in 1898. Degrees were added for civil engineering (1901), electrical engineering (1902), mechanical engineering (1906), chemical engineering (1907), ceramic engineering (1919), aeronautical engineering (1929), bioengineering (1983), industrial engineering (1986), and computer engineering (1987). A degree program in technical communication was implemented in 1991. In 2003, 1,669 upper-division undergraduate majors and 1,306 graduate students were enrolled in engineering programs taught by a faculty of 191 members.

College Facilities

Teaching and research activities of the College are conducted in thirteen major campus buildings (and portions of others), which contain the College's offices, classrooms, and research and teaching laboratories. The Engineering Library, a branch of the University Libraries, provides outstanding collections of books, periodicals, technical reports, and patents of interest to engineers. Computers and terminals are available in all departments and through the Student Access and Computing Group (SACG).

Student Organizations and Activities

All of the major professional engineering societies have student chapters on campus, and all engineering students are encouraged to join the chapter that represents their field of interest. The College also has student chapters of the Society of Women Engineers, American Indian Science and Engineering Society, National Society of Black Engineers, the Society of Hispanic Professional Engineers, and the Phi Sigma Rho engineering sorority. Students are encouraged to join the university-wide Science and Engineering Business Association (SEBA).

The honor society open to engineering students is Tau Beta Pi.

Students serve with faculty members on engineering policy committees which make recommendations concerning instructor evaluation, curriculum revisions, advising, grading systems, and other matters of interest to students and faculty.

Undergraduate Program

Engineering Adviser
301 Loew, Box 352180
206-543-1770
engradv@enr.washington.edu

The College of Engineering provides curricula that offer a variety of educational experiences to its students. The curricula also facilitate transfer from community colleges and from other four-year colleges and universities.

Engineering Advising and Student Center

301 Loew

Students are encouraged to contact the Engineering Advising and Student Center for program, course, or career information and discussion. The center assists any student interested in planning the initial portion of an engineering degree program, and distributes information about prerequisites for application to all the departments in the College. A student interested in engineering should identify engineering as the intended major while still in the College of Arts and Sciences and seek advice in the center.

For more information, visit the Engineering Advising and Student Center Web site.

Financial Aid

The College offers financial assistance to undergraduates through industrial scholarships and loan funds. Scholarship information is available at the College of Engineering Advising and Student Center (301 Loew), and at the Office of Student Financial Aid, 105 Schmitz. Most scholarships are given after a year or more in residence by the student.

Honors Program

301 Loew

The College of Engineering Honors Program offers students of outstanding performance and achievement a course of study designed to provide intellectual challenge in a stimulating learning atmosphere which draws on the resources of a large, diversified university. Students entering the Honors Program become candidates for the degree "With College Honors" or "With Distinction."

The College Honors Degree

Students who complete this program receive a degree "With College Honors."

The College honors degree requires that students participate in the University Honors Program while taking engineering prerequisites in the College of Arts and Sciences. When these students are admitted to engineering departments, they may be nominated to enroll in the Engineering Honors Program. Completion of the College Honors degree involves both an honors general-education component and advanced honors work completed after students have been admitted to the College of Engineering.

Admission Requirements: Minimum cumulative GPA of 3.30, minimum departmental GPA, and participation in the University Honors Program as a pre-engineer.

Graduation Requirements: The College honors curriculum consists of two parts: a general-education component and a component in the student's major department. The general-education component is completed while the student is in the College of Arts and Sciences prior to application to the College of Engineering. Students select three sequences, each three quarters long, from honors A&S courses, the Natural World, and Mathematics (selecting at least one from each).

The second component begins when a student is admitted to an engineering department. Students then select a total of 9 credits of College honors courses with a minimum of 3 credits of departmental 499H Special Projects (or ENGR 499H). The additional honors credits can be fulfilled with either special projects or ad hoc courses.

The Departmental Honors Degree

Students who complete this program receive a degree "With Distinction."

Admission Requirements: Minimum cumulative GPA of 3.30, minimum departmental GPA (varies from department to department).

Graduation Requirements: Students are nominated for the Departmental Honors Program when they have been in their department for a minimum of one quarter. Students select a total of 9 credits of college honors courses with a minimum of 3 credits of departmental 499H Special Projects (or ENGR 499H). The additional honors credits can be fulfilled with either special projects or ad hoc courses.

Departmental honors degrees are offered in the following degree programs: Aeronautics and Astronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, Materials Science and Engineering, Mechanical Engineering, Technical Communication, and Paper Science and Engineering. The paper science and engineering major is offered in the College of Forest Resources and is a joint program with the College of Forest Resources and the College of Engineering.

International Study

Given the increased likelihood that engineering students will have overseas work experiences or will do business with international clients and competitors, the College encourages students to study foreign languages in addition to their engineering course work and to take advantage of opportunities for study at foreign universities either at the undergraduate or graduate level. The College has active exchange agreements with approximately thirty-six universities in eighteen countries. Foreign-language courses at the third-quarter level or above (e.g., GERMAN 103) may be applied toward the VLPAs general education requirement. Students may contact the Engineering Advising and Student Center, 301 Loew, for information about opportunities for international study. Engineering students can also participate in the Global Engineering Education Program (through the Women in Science and Engineering Program) for opportunities to study abroad, located in 101 Wilson Annex.

Recommended High School Preparation

Substantial high school preparation in mathematics, physical science, and communication is essential for entrance to engineering studies. Required and recommended courses may be determined from the Engineering Advising and Student Center (301 Loew).

Admission

Students who indicate an interest in engineering on their University admission application are assigned pre-engineering status. Students without pre-engineering status who wish to pursue an engineering degree may have their coding changed to pre-engineering upon request at the Engineering Advising and Student Center (301 Loew) or the Undergraduate Advising Gateway Center (171 Mary Gates Hall). As a pre-engineering major, a student takes courses in mathematics, chemistry, physics, English composition, engineering fundamentals, and all other prerequisite courses for admission to the desired engineering departmental program. In addition, courses in Visual, Literary, & Performing Arts and Individuals & Societies are taken.

Admission requirements vary for departments or programs within the College of Engineering. Some departments or programs offer early admission, either at the point of freshman admission (Early Decision), or after the freshman year is complete and certain minimum course requirements have been met. Early Admission is for Autumn quarter only. For specific, up-to-date information regarding the admission requirements for a department or program, the applicant should contact the Engineering Advising and Student Center (301 Loew) or the undergraduate adviser for the specific department or program of interest. In addition, all departments and programs within the College provide up-to-date course and admission information on the World Wide Web.

For general upper-division admission, students must apply to the engineering department or program after completion of the prerequisite courses for the program. In general, prerequisite courses include one year of calculus, one or two quarters of general chemistry, two to three quarters of physics, English composition, and several engineering fundamentals. The Engineering Advising and Student Center or the individual department or program has a list of specific entrance requirements.

Types of Programs

The College offers three basic programs leading to Bachelor of Science degrees:

Departmental Major: This program leads to a Bachelor of Science degree in a designated field of engineering (e.g., Bachelor of Science in Civil Engineering). It is designed for students who intend to practice as professional engineers in a standard branch of engineering or who plan to undertake graduate study in that field. The curricula for these degrees are accredited by the Accreditation Board for Engineering and Technology (ABET), the principal engineering accrediting agency in the United States. Accreditation requirements stipulate certain course-distribution requirements for the undergraduate degree. A description of how each of the accredited baccalaureate programs meets the ABET requirements is available from the department office and from the College office. Accredited four-year curricula leading to baccalaureate degrees are offered in aeronautics and astronautics, chemical, civil and environmental, computer, electrical, industrial, mechanical, materials science, and paper science and engineering. (The paper science and engineering major is offered in the College of Forest Resources and is a joint program with the College of Forest Resources and the College of Engineering.)

Curricula leading to baccalaureate degrees are offered in bioengineering and technical communication. The bioengineering program is planning to apply for accreditation in 2007.

Application to a department or program at the upper-division level is made at the time lower-division requirements are satisfied. Currently, enrollment limits imposed by faculty size and available laboratory/classroom space are such that entry into a specific department or program may be competitive. In general, a student applicant must demonstrate scholastic aptitude, as evidenced by the attainment of grades averaging a minimum 2.50 or above (depending upon the program) in mathematics, the Natural World, English composition, and other courses. A 2.50 GPA is a minimum only. In reality, the GPA of those offered admission is higher. The student is urged to plan ahead by learning the intended department or program requirements and particularly noting which requirements must be fulfilled by the time application is made.

Nondepartmental Professional Program: This program leads to a Bachelor of Science in Engineering degree and is designed for students who have well-defined, special educational objectives that departmental programs do not satisfy. Graduates can practice as professional engineers in newly developing fields, or they may embark on graduate study in these or allied fields (see Interdisciplinary Engineering Studies Program).

Nonprofessional Program: Leading to a Bachelor of Science degree, this program is intended for students who wish to have significant exposure to science and engineering courses, but do not plan to engage in professional engineering practice (see Interdisciplinary Engineering Studies Program).

Graduation Requirements

To graduate, students must meet or exceed the requirements of the University, the College, and their particular program or department. College requirements are listed in this section, and program or departmental requirements are given in the specific section that describes that program or department.

All departments of the College have continuation policies that specify a minimum rate of progress as well as minimum academic-performance levels. These policies may be more restrictive than those generally applied by the University and may change with time. Information on current policy is available at the departmental offices.

Selecting courses that fulfill graduation requirements is the responsibility of each student. Students are urged to check carefully the course and credit requirements of the program in which they are enrolled.

Continuation Policy

While the University has general regulations governing scholastic eligibility for continuance, departments and programs in the College of Engineering have adopted additional requirements in order to make the best use of the limited facilities and resources available and to provide reasonable assurance of academic success. The following criteria and procedures are applied to all undergraduate students for determining continuance in the major program.

1. Full-time students are expected to complete 12 or more credit hours per academic quarter applicable toward the degree program. (An average of 15-16 hours per quarter is required to complete the graduation requirements in 12 quarters.)
2. Part-time attendance may be allowed. Refer to written departmental guidelines for criteria. Written permission must be obtained from a departmental undergraduate adviser for a student to attend on a part-time basis. Students who have received permission to attend part time must complete at least one course each quarter applicable toward their degree. Application for part-time students should be made prior to the first day of the quarter in which the student wishes to attend part time.
3. A student who withdraws from the University without prior written approval or is dropped for non-payment of fees must obtain approval of the departmental admissions committee before registering or maintaining pre-registration for the following academic quarter. In such cases the department registration may be disallowed or canceled if the student's academic record is not competitive with the admission requirements prevailing at the time.
4. All undergraduate students who have exceeded the graduation requirements of the degree program for which they have been accepted by more than 10 credits are transferred by their department to the College of Arts and Sciences.
5. Students are required to maintain a grade point average of 2.00 in all departmental and professional program courses. The grade point average is computed by considering all engineering college departmental courses of 300 level or higher, including repeated courses, but excluding Visual, Literary, & Performing Arts (VLPA) and Individuals & Societies (I&S) distribution requirements. If the grade point average in these courses does fall below 2.00, a student is placed on departmental probation and must achieve a quarterly average grade point higher than 2.00 the following quarter or be dropped from the department and transferred to the College of Arts and Sciences.
6. The minimum acceptable grade for any course required for each major is set by the individual department. If a grade received is less than the minimum, a student may repeat the course without loss of course entry priority. Otherwise, the decision to admit a student to a course depends upon space available.
7. The progress of each student is reviewed each quarter. If a student's performance fails to meet the standards outlined above, the student is placed on probation the following quarter. The student is notified in writing of the reason for probation and is told what must be done for removal from probation. If the student does not show progress toward removing the deficiencies in the following quarter, the student is notified in writing, dropped from the department, and transferred to the College of Arts and Sciences.

The College recognizes that inequities can result from any continuation policy. If students are placed on probation or dismissed and believe that their record has been misunderstood, they may request reconsideration of the probation or dismissal by writing a letter to the department chairman. The letter should include any additional supporting or relevant material. The letter and the supporting material is transmitted to the department faculty committee. The faculty committee reviews carefully all available information and then decides whether or not academic probation shall be continued for another quarter or whether the dismissal was appropriate and valid. The student appeal must be made within 30 days of the notification of placement on probation or dismissal. The committee responds to the student appeal within 30 days.

General Education Requirements: 85 Credits

The College requires a minimum number of credits within certain areas of study and some specific courses within certain areas. All programs require the following:

- * *Areas of Knowledge:* 49 Credits
 - o Visual, Literary, & Performing Arts and Individuals & Societies: 24 credits minimum. Some programs within the College require 30-35 credits. Visual, Literary, & Performing Arts (VLPA) includes courses in literature, art, music, and drama which stress the essential qualities of

individual forms of expression. First- and second-quarter language courses may not be counted toward the VLPA requirement. Individuals & Societies includes courses in history, economics, psychology, and sociology which stress the social nature of mankind, and the development and analysis of societies and social institutions. Courses that count toward these requirements are identified as VLPA or I&S in the Course Descriptions and in the quarterly Time Schedule. A minimum of 10 credits is required in each area.

- o Natural World: 20-25 credits. Most departments within the College require chemistry (10 credits): CHEM 142, CHEM 152 (some departments do not require CHEM 152); and physics (15 credits): PHYS 121, PHYS 122, PHYS 123. Please consult an adviser in the Engineering Advising and Student Center (301 Loew) or the departmental adviser.
- * *Mathematics:* 18 Credits. Specifically required are MATH 124, MATH 125, MATH 126, and MATH 308. Additional credits may be specified or recommended by the department or program.
- * *Written and Oral Communication:* 12 Credits. One 5-credit English composition course from the approved University list. T C 231, Introduction to Technical Writing (3 credits), and T C 333, Advanced Technical Writing and Oral Presentations (4 credits, or department-approved alternative).
- * *Engineering Departmental Course of Study:* 95 Credits. Major departments or specific programs require at least 95 credits in their curricula. These course sequences were developed to culminate in a major, meaningful design experience.

Special Programs

Engineering Co-op Program (three to six month internships)

Program Coordinator, Dawn Wiggins
301 Loew, Box 352180
coop@enr.washington.edu

The Co-op Program provides an opportunity for pre-engineering and engineering students to combine practical, full-time, on-the-job engineering experience with full-time academic study. Students typically take a break from their studies for six months to work full-time and return to full-time academic status upon completion of the co-op assignment. In addition, students receive academic credit for the co-op experience. Advantages to participation include assistance in deciding which field of engineering to follow, additional income to help defray college expenses, relevance and motivation for study based on real engineering work, and work experience and employment contacts that may result in regular employment after graduation.

Information may be obtained from the Co-op Program Office, College of Engineering, Box 352180 (301 Loew), or by visiting the Co-op Program Web site.

Educational Outreach

Fulfilling a commitment to lifelong learning, the College of Engineering offers courses, workshops, and conferences to respond to the professional development needs of practicing engineers and related technical professionals worldwide. Through Engineering Professional Programs (EPP) and Education at a Distance for Growth and Excellence (EDGE) thousands of practicing engineers update their technical knowledge or pursue advanced degrees each year. For more information, contact Engineering Professional Programs at 206-543-5539, or Education at a Distance for Growth and Excellence at 206-685-2242.

For more information, see the Engineering Professional Programs and Education at a Distance for Growth and Excellence Web sites.

Special Facilities

Office of Engineering Research

Coordinator, Mary Heusner
372 Loew, Box 352180

The Office of Engineering Research promotes, stimulates, and coordinates research in all fields of engineering. Its primary role is to coordinate interdisciplinary research programs and national research initiatives. The Office of Research also reviews grant and contract proposals, tracks awards, and provides information on funding opportunities. This office allocates limited matching funds to College units to increase the quality of research in the College of Engineering.

The College currently has the following research programs or centers: NSF ADVANCE, Center for Engineering Learning and Teaching (CELT), Center for the Advancement of Engineering Education (CAEE), UW Engineered Biomaterials Research Center (UWEB), Microscale Life Sciences Center (GenOM Project), Center for Nanotechnology, Washington State Transportation Center (TRAC), and the FAA Center of Excellence for Advanced Composite Materials.

For more information, see the Office of Engineering Research Web page.

Interdisciplinary Engineering Studies Program

301 Loew

The College of Engineering directly administers nondepartmental undergraduate and graduate degree programs. Some engineering fundamentals and writing courses required for admission to the departments are managed by specific engineering departments.

Undergraduate Programs

301 Loew

The Interdisciplinary Engineering Studies (IES) Program is intended for students whose desired course of study does not fall within one of the traditional engineering departments. An interdisciplinary program combines course work from at least one engineering department as well as other department(s) on campus (Engineering or other) to allow students to create a program of study not available through the existing undergraduate degree programs. Although course work may involve departments outside the College of Engineering, the major thrust must be in engineering.

The IES Program offers a nonprofessional degree program leading to the Bachelor of Science (B.S.) and a professional degree program for the Bachelor of Science in Engineering (B.S.E.).

Due to the uniqueness of each interdisciplinary student's program of studies, the B.S. and B.S.E. degrees are not accredited by the Accreditation Board for Engineering and Technology (ABET). The experience requirement to obtain a professional engineering license is two years longer for a B.S.E. graduate, except in surveying, than for a graduate of an accredited program. A B.S. graduate is not eligible for a professional engineering license.

Interdisciplinary students develop personal programs of study approved by a faculty adviser with similar interests. Programs are reviewed and approved by the Interdisciplinary Committee, which oversees all undergraduate interdisciplinary-study programs. Contact the Engineering Advising and Student Center, 206-543-1770, for information on established procedures and applications for entry into the B.S.E. and B.S. programs. Entrance requirements and the continuation policy for participation in these programs are consistent with those of other departments in the College.

Bachelor of Science in Engineering

Admission to this program (usually after completion of 90 credits) is competitive with a minimum GPA of 2.80 in technical courses required for entry. A minimum of 75 credits must be completed after entering the program before a B.S.E. degree is awarded. Detailed information regarding the B.S.E. degree can be obtained from an adviser in the Engineering Advising and Student Center (301 Loew).

Bachelor of Science

The nonprofessional Bachelor of Science degree provides greater flexibility than does the Bachelor of Science in Engineering degree. It can be an excellent base for subsequent professional studies in law, medicine, or business. It may also be the primary educational objective in such fields as technical writing, engineering sales, or environmental studies. Detailed requirements are available from the adviser in the Engineering Advising and Student Center (301 Loew).

Graduate Programs

Master of Science in Engineering/Master of Science

The College also offers graduate programs leading to the Master of Science in Engineering and Master of Science degrees, without designation of a

specific major. For graduate degrees within specific majors, see the individual departmental listings.

Approved programs lead to the M.S.E. degree in civil, mechanical, electrical, chemical, and interengineering, and approved programs lead to the M.S. degree in civil engineering, interengineering, and materials science and engineering.

The Interengineering Master of Science in Engineering (M.S.E.) and Master of Science (M.S.) program is intended for students whose desired course of study includes two or more engineering departments and may also include study in departments outside the College of Engineering. Applications and files of students entering the M.S./M.S.E. option are handled by the designated department. Admission to the interengineering option requires a statement describing the applicant's objectives. This statement should state why the student wants to enter the M.S./M.S.E. program rather than one of the traditional engineering graduate programs. Applicants to the M.S./M.S.E. program must have well-defined educational objectives which cannot be satisfied by established engineering programs.

Admission Requirements

M.S.E./M.S. applicants are required to have a bachelor's degree in engineering, mathematics, or science with a minimum GPA of 3.00 in courses taken in the junior and senior years. Students entering without an accredited engineering undergraduate degree and seeking an MSE degree must satisfy the minimum general requirements of the College of Engineering baccalaureate degree. Students are expected to complete the degree within two years. Situations requiring longer than this must be approved by the student's faculty advisor.

Development of the Plan of Study: When applying to the M.S.E./M.S. program, the applicant must submit a plan of study that sets out the intended 400- and 500-level course work and proposed thesis topic. Before applying to the M.S.E. program, the student must consult with a faculty member from each department in which the student intends to work, and identify at least one to serve as the student's faculty adviser. The other faculty members can serve on the student's supervisory committee if the student is admitted. Working with the faculty adviser(s), each student must develop a plan of study and research that meets the general degree requirements (below) and satisfies the student's own program objectives. The program of studies must include in-depth coursework from two or more departments and be approved by the faculty adviser(s). The proposed program is then set out on the student's Application to the Interengineering M.S.E./M.S. Program.

Development of the Statement of Objectives: Students must submit a one-page statement of study, degree, and career objectives for seeking the Interengineering M.S.E./M.S. degree. This statement should explain why the student wants to enter the M.S.E./M.S. program rather than one of the traditional engineering graduate programs. Also, students should include in this statement any additional information to be considered as part of the application. This information may include work experience, outside interests, and unusual circumstances that may contribute to a better understanding of the student's record. Applicants to the M.S.E./M.S. program must have well-defined educational objectives that cannot be satisfied by established engineering programs.

Degree Requirements

Students develop their own plan of study for the M.S. or M.S.E. degree in consultation with faculty adviser(s) as a requirement for admission to the program. The plan of study must contain at least 39 credits of coursework, with no more than 9 credits of engineering courses at the 400 level and at least 21 credits of engineering courses at the 500 level. The plan of study must also include at least 9 credits of thesis study/preparation.

Aeronautics and Astronautics

310 Condon Hall

Aeronautics and astronautics deals with the design and analysis of air and space vehicles and a broad spectrum of related engineering science, such as aerodynamics, structural mechanics, automatic controls, flight mechanics, space dynamics, propulsion, plasma dynamics, and related topics.

Undergraduate Program

Adviser

328 Condon Hall, Box 352400
206-616-1115
ugadvising@aa.washington.edu

The department offers the following programs of study:

- * The Bachelor of Science in Aeronautical and Astronautical Engineering degree

Bachelor of Science in Aeronautical and Astronautical Engineering

Suggested First- and Second-Year College Courses: During the first-year, students should take the required calculus, chemistry, English composition, and computer programming. If possible, begin taking the physics sequence. It is recommended that some VLPAs and I&S courses be taken to balance the course load.

Department Admission Requirements

Applicants are considered in two groups -- Early Admission and Upper-Division Admission. Admission is competitive. Thus, completion of minimum requirements does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision. Applications are accepted for autumn quarter only; application deadline is July 1.

Early Admission (Limited number of students admitted through this process)

1. Course requirements: MATH 124, MATH 125, MATH 126; 10 credits of physical science courses plus accompanying laboratory at the level of PHYS 121, PHYS 122, PHYS 123, or CHEM 142 or above; and 5 credits of English composition. All courses must be completed prior to the July 1 application deadline.
2. Applicants must be currently enrolled at the UW and must have a minimum of 15 credits taken in residence at the UW.
3. Early admission students may start the autumn-quarter, junior-year program after meeting the requirements and standards for upper-division admission.

Upper-Division Admission

1. Course requirements: MATH 124, MATH 125, MATH 126, MATH 307, MATH 308, PHYS 121, PHYS 122, PHYS 123, CHEM 142, CSE 142, A A 210, M E 230, CHEM E 260, and 5 credits of English composition. Of the following three courses required for admission, one may be completed the autumn quarter of admission: CEE 220, T C 231, MATH 324.
2. At least 75 credits must be completed, with a minimum overall GPA of 2.50 and a minimum grade of 2.0 in each course required for admission.

Graduation Requirements

180 credits as follows:

1. General Education Requirements (85 credits)
 - a. Areas of Knowledge: 49 credits as follows: Visual, Literary, and Performing Arts (VLPAs), and Individuals & Societies (I&S): 24 credits. Natural World: 25 credits, to include CHEM 142 (5) and PHYS 121, PHYS 122, PHYS 123 (15 credits). An additional 5 credits of natural-world courses are required. See department for a list of approved courses.
 - b. Mathematics: 24 credits to include MATH 124, MATH 125, MATH 126, MATH 307, MATH 308, and MATH 324 (which must be completed no later than autumn quarter of admission to the department).
 - c. Written and Oral Communications: 12 credits, to include one 5-credit English composition course from the University list; T C 231, which

must be completed no later than the autumn quarter of admission to the department; and T C 333 (or department-approved alternative).

2. Major Requirements (95 credits)
 - a. Engineering Fundamentals: 20 credits, to include CSE 142, A A 210, M E 230, and CHEM E 260, all of which must be completed prior to admission; CEE 220, which must be completed no later than the autumn quarter of admission to the department (if MATH 324 has been taken prior to autumn quarter).
 - b. Professional Courses: 74 credits. The department program begins in the autumn quarter of the junior year. Junior-year professional program courses are all required. The senior year consists of A A 409, A A 410-A A 411 or A A 420-A A 421, A A 450, A A 498, and 15 credits of senior technical electives. With approval, 3 credits of the latter may be chosen from another area of engineering.
 - c. Electives: 1 credit of free electives, which may be used to meet the 180 credits required for graduation.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The goals and objectives of the undergraduate program are to provide a challenging and comprehensive education, to develop necessary functional skills and an understanding of the societal context in which engineering is practiced, to provide a solid foundation in the engineering sciences related to aerospace engineering, to provide a strong systems perspective, to develop engineering creativity through design experience, and to prepare graduates to succeed in engineering careers and lifelong learning.

Graduates of aeronautics and astronautics are skilled in engineering fundamentals, engineering design, laboratory skills, synthesis of various engineering disciplines, and working in a team environment. Graduates are highly regarded by employers in aeronautics, astronautics, energy systems, and related fields. They develop interpersonal skills and a desire for life-long learning that helps them succeed in their chosen careers. Graduates have been successful and valued at local, national, and international industries, as well as at government organizations and institutions of higher learning.

- * *Instructional and Research Facilities:* Visit the department Web page to view current research activities. Undergraduates are encouraged to participate in research activities.
- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.
- * *Research, Internships, and Service Learning:* Internships are arranged individually. See adviser for details.
- * *Department Scholarships:* Scholarships are limited and are usually reserved for students who have junior and senior standing in the department. Deadline for scholarship applications is April 1.
- * *Student Organizations/Associations:* American Institute of Aeronautics and Astronautics (AIAA) student chapter. Sigma Gamma Tau

Graduate Program

Graduate Program Coordinator
328 Condon Hall, Box 352400
206-616-1113
gradadvising@aa.washington.edu

The Department of Aeronautics and Astronautics offers programs that provide a foundation in the aerospace engineering sciences and expertise in various specialized application areas. Three graduate degree options are offered: Master of Science in Aeronautics and Astronautics, Master of Aerospace Engineering, and Doctor of Philosophy.

Master of Science in Aeronautics and Astronautics (M.S.A.A.)

Admission Requirements

- * *Grade Point Average:* The Graduate School requires that applicants hold a GPA of at least 3.00 for the last 90 quarter hours or 60 semester hours of graded undergraduate course work to be considered for admission. Applicants admitted by the department normally have a minimum GPA of 3.30. Applicants with less than a 3.30 GPA may still be considered for

admission if they have other strong credentials, such as graduation from an outstanding undergraduate program and excellent GRE scores.

- * *Quality and Difficulty of Courses Taken and Universities and Colleges Attended:* Each transcript is individually reviewed. The department recognizes that some academic institutions are more competitive and high grades are more difficult to obtain.
- * *GRE General Test:* The department requires applicants to take the general portion of the Graduate Record Examination. Although the department does not have minimum GRE scores, the typical successful applicant to the program has scores in excess of 450 Verbal, 700 Quantitative, 650 Analytical, or 5.0 Analytical Writing. If the applicant wishes to be considered for a graduate assistantship or fellowship, the scores should be received before February 15th.
- * *Two Letters of Recommendation:* The confidential letters of recommendation should be placed in sealed envelopes and included with the application materials, or sent directly to the department by the recommenders.
- * *Statement of Objectives:* A statement of objectives should be written providing the department with information about the applicant not found in the transcripts and other official documents.
- * *English Requirements for Foreign Students:* Minimum TOEFL scores of 580 on the paper-based exam or 237 on the computerized exam are required for foreign students whose native language is not English.
- * *Prior Degrees:* Prospective students should hold an undergraduate degree in aerospace or mechanical engineering. Applicants with strong grades (3.5 and above) in related disciplines (physics, other engineering disciplines) will be considered.

Degree Requirements

39-45 credits, as follows:

- * All M.S.A.A. degree candidates must have a program of study plan approved by the Graduate Committee of the Department of Aeronautics and Astronautics.
- * Before completing 12 credits of graduate course work, file a program of study plan which has been prepared with the assistance of the adviser or with the Graduate Program Adviser. This program will be submitted to the Graduate Committee for approval.
- * The minimum M.S.A.A. program may consist of either ten courses plus 9 thesis credits, or 13 courses. No more than three of the courses may be at the 400 level (though not in a student's depth area). In addition, each student must enroll in the graduate seminar (A A 520) during each quarter of full-time studies, and attend an average of five times per quarter.

The student's program of study is tailored to the needs and interests of the student. However, each program must include depth in a field of specialization, breadth to include at least one course in each of two different subject areas outside the field of specialization, and analytical strength to include three mathematical courses. Senior sequences in engineering, science, or other appropriate professional fields may be used to make up part of the individualized graduate program. However, only three undergraduate courses will be counted toward the minimum requirements (and none in the student's depth area).

- * The thesis, if that degree option is chosen, is approved by the student's adviser and second reviewer and submitted to the Graduate School. After submitting one copy of the thesis to the department, two signed, unbound copies of the thesis and receipt for binding fee must be submitted to the Graduate School by the last day of the quarter.

It usually takes one and a half to two years of full-time study to complete the requirements for an M.S.A.A. degree. The Graduate School imposes a time limit of six years for any master's degree.

Master of Aerospace Engineering (M.A.E.)

The M.A.E. program is intended for recent graduates or engineers who wish to expand their knowledge in multidisciplinary areas while also learning other aspects of aerospace engineering, such as business, management, manufacturing, or technical communication.

Admission Requirements

- * *Grade Point Average:* The Graduate School requires that applicants hold a GPA of at least 3.00 for the last 90 quarter hours or 60 semester hours of graded undergraduate course work to be considered for admission.

Applicants admitted by the department normally have a minimum GPA of 3.30. Applicants with less than a 3.30 GPA may still be considered for admission if they have other strong credentials, such as graduation from an outstanding undergraduate program and excellent GRE scores.

- * *Quality and Difficulty of Courses Taken and Universities and Colleges Attended:* Each transcript is individually reviewed. The department recognizes that some academic institutions are more competitive and high grades are more difficult to obtain.
- * *GRE General Test:* The department requires applicants to take the general portion of the Graduate Record Examination. Although the department does not have minimum GRE scores, the typical successful applicant to the program has scores in excess of 450 Verbal, 700 Quantitative, 650 Analytical, or 5.0 Analytical Writing. If the applicant wishes to be considered for a graduate assistantship or fellowship, the scores should be received before February 15th.
- * *Two Letters of Recommendation:* The confidential letters of recommendation should be placed in sealed envelopes and included with the application materials, or sent directly to the department by the recommenders.
- * *Statement of Objectives:* A statement of objectives should be written providing the department with information about the applicant not found in the transcripts and other official documents.
- * *English Requirements for Foreign Students:* Minimum TOEFL scores of 580 on the paper-based exam or 237 on the computerized exam are required for foreign students whose native language is not English.
- * *Prior Degrees:* Prospective students should hold an undergraduate degree in aerospace or mechanical engineering. Applicants with strong grades (3.5 and above) in related disciplines (physics, other engineering disciplines) will be considered.

Degree Requirements

45-54 credits.

Students create their own programs of study based on departmental distribution requirements and subject to departmental approval, to include courses in a specialty area, technical and non-technical electives, analytical courses, and a group or independent project. The M.A.E. program includes twelve courses plus 8 credits for the project, or ten courses and one of three business certificate programs.

Doctor of Philosophy (Ph.D.)

The doctoral program consists of lectures, seminars, discussions, and independent study, enabling the student to master and to make original contributions to a particular field.

Admission Requirements

- * *Grade Point Average:* The Graduate School requires that applicants hold a GPA of at least 3.00 for the last 90 quarter hours or 60 semester hours of graded undergraduate course work to be considered for admission. Applicants admitted by the department normally have a minimum GPA of 3.30. Applicants with less than a 3.30 GPA may still be considered for admission if they have other strong credentials, such as graduation from an outstanding undergraduate program and excellent GRE scores.
- * *Quality and Difficulty of Courses Taken and Universities and Colleges Attended:* Each transcript is individually reviewed. The department recognizes that some academic institutions are more competitive and high grades are more difficult to obtain.
- * *GRE General Test:* The department requires applicants to take the general portion of the Graduate Record Examination. Although the department does not have minimum GRE scores, the typical successful applicant to the program has scores in excess of 450 Verbal, 700 Quantitative, 650 Analytical, or 5.0 Analytical Writing. If the applicant wishes to be considered for a graduate assistantship or fellowship, the scores should be received before February 15th.
- * *Two Letters of Recommendation:* The confidential letters of recommendation should be placed in sealed envelopes and included with the application materials, or sent directly to the department by the recommenders.
- * *Statement of Objectives:* A statement of objectives should be written providing the department with information about the applicant not found in the transcripts and other official documents.
- * *English Requirements for Foreign Students:* Minimum TOEFL scores of 580 on the paper-based exam or 237 on the computerized exam are required for foreign students whose native language is not English.
- * *Prior Degrees:* Prospective students should hold undergraduate and graduate degrees in aerospace or mechanical engineering with a minimum GPA of 3.40. Applicants with strong grades (3.4 and above) in

related disciplines (physics, other engineering disciplines) will be considered.

Degree Requirements

In addition to the formal steps for obtaining the degree listed below, the student must complete an approved program of study consisting of 30 credits of course work beyond that required for the Master of Science in Aeronautics and Astronautics, for a total of 90 credits for the Ph.D.

- * *The Departmental Qualifying Examination:* To take the department qualifying examination, a student must have a 3.40 GPA in technical course work at the graduate level.

A student judged to have passed the qualifying exam can continue with the Ph.D. program. If a student does not pass, at the discretion of the examining committee, the student may be allowed to retake it a second time. If a student chooses to retake the exam and fails a second time, he or she will be dropped from the Aeronautics and Astronautics degree programs.
- * *The General Examination:* Upon successful completion of the qualifying examination, a Ph.D. supervisory committee chaired by the student's major adviser will be appointed. The general exam is expected to be taken within one year after the qualifying exam, but no sooner than two years after the beginning of graduate study.
- * *The Completion of Course Work:* The department requires at least 30 credits of course work in addition to that for the M.S.A.A. degree. A form listing the courses to be taken must be approved by the student's adviser and placed in the student's file.
- * *The Preparation of the Dissertation:* The dissertation requires a substantial effort, generally equivalent to at least one year of full-time study, and must demonstrate original and independent research and achievement.
- * *The Final Examination:* When the dissertation is completed to the satisfaction of the chair of the Supervisory Committee, a reading committee of three is appointed from the student's committee. If the reading committee agrees that the dissertation is satisfactory, then the final examination is scheduled. That examination is generally devoted to a presentation and defense of the dissertation.

Research Activities

Research facilities include the Kirsten 8 x 12-foot low-speed wind tunnel, a 3 x 3-foot low speed wind tunnel, two water tunnels, a small supersonic draw-down tunnel, a hypervelocity projectile accelerator (ram accelerator), material and structural test machines, a composite-material laboratory, an unmanned aerial vehicle (UAV) laboratory an underwater vehicle laboratory, a guidance and controls laboratory, a distributed space systems laboratory, various plasma and fusion-research and engineering physics laboratories, a combustion laboratory and a Mars environmental simulation facility. A variety of computer facilities is available, including a 17-computer parallel cluster for computational fluid dynamics research. The Aerospace and Energetics Research Program, which conducts interdisciplinary research in the Aerospace and Engineering Research Building, is also part of the Department of Aeronautics and Astronautics.

Externally funded research is carried out by faculty members and students on such topics as buoyant flows, flow separation control, combustor mixing, shear layers, computational fluid dynamics, internal flows, reacting flows, ram accelerators, space energy systems, space system design, control system design and engineering, robust and optimal control, wing optimization, impact mechanics, composite material structure and fracture, plasma dynamics, space propulsion, and fusion research.

Special Facilities/Programs

Aerospace and Energetics Research Program (AERP)

120 Aerospace and Engineering Research Building

The Aerospace and Energetics Research Program is directed toward high-technology engineering research and teaching through research. The program anticipates and tries to outpace the nation's critical technology needs. It therefore emphasizes those engineering skills that both match the requirements of the present and future, and develop in students a broad understanding of the impact of technology on society. Suitable programs are

designed to develop the student's imagination and a willingness to respond to the complex and rapidly changing future of engineering. This directs the faculty's efforts and creates within the principal investigators, research faculty, and students the concept of engineering as an adventure.

The program covers many fields, usually centered on energy or aerospace systems. Currently the program is active in plasma engineering related to fusion power and space propulsion, ram accelerators for direct space launch, and research on new terrestrial energy conversion and vehicle propulsion technologies.

University of Washington Aeronautical Laboratory (UWAL)

Kirsten Aeronautical Laboratory

The primary facility that UWAL operates is the Kirsten Wind Tunnel, a subsonic, closed-circuit, double-return tunnel with an 8x12-foot test section. Undergraduate students, usually from the Department of Aeronautics and Astronautics, are employed at UWAL to run tests for University research, commercial customers, and for instructional uses, such as student projects. UWAL provides departmental support for research projects such as the unmanned aerial vehicle (UAV) project.

Additional Information

Most students are financially supported by the department as teaching or research assistants, or by their employers. For further information on this or other aspects of department programs, contact the Graduate Program Coordinator, 328 Condon Hall, Box 352400, or visit the department's Web site.

Course Descriptions

See page 491.

Bioengineering

309 Harris Hydraulics Laboratory

Bioengineering encompasses a wide range of activities in which the disciplines of engineering and biological or medical science intersect. Such multidisciplinary endeavors are yielding new discoveries and major advances that are revolutionizing the health care system. The Department of Bioengineering, housed jointly in the School of Medicine and the College of Engineering, provides a comprehensive, multidisciplinary program of education and research and is recognized as one of the finest bioengineering programs in the world. Major areas of research and education include distributed diagnosis and home healthcare (d2h2), molecular bioengineering and nanotechnology, engineered biomaterials and tissue engineering, medical imaging and image-guided therapy, and computational bioengineering.

Undergraduate Program

Adviser
309B Harris Hydraulics Lab, Box 357962
206-685-2000
bioeng@u.washington.edu

The Bioengineering Program offers the following programs of study:

- * The Bachelor of Science in Bioengineering degree

The Bachelor of Science in Bioengineering bridges the gap between the engineering and biological sciences. Advanced interdisciplinary coursework builds upon a solid foundation of mathematics, computing, engineering, and physical and biological sciences. Students learn to apply engineering synthesis and analysis to biological problems and to glean design principles from nature to solve medical problems and create biomedical devices and materials. A key piece of the degree program is the senior capstone research and design project, through which students develop their knowledge and skills by joining in the department's cutting-edge research. Bioengineering graduates are prepared to enter graduate school, medical school, or the growing biomedical industry. The department's goal is to prepare students to be leaders and innovators in improving human health and health care.

Bachelor of Science in Bioengineering

Suggested First- and Second-Year College Courses: CHEM 142, CHEM 152, CHEM 162, CSE 142, English Composition, MATH 124, MATH 125, MATH 126, PHYS 121.

Department Admission Requirements

Because resources are limited, students must apply for admission to the Bioengineering program. Students may be admitted at three different points. Please consult the department's Web page for more information.

1. *Direct Admission.* The department enrolls up to 25 percent of its incoming class directly from high school. Students who are accepted to the University and who indicate Bioengineering as their preferred major on their freshman application are considered for admission. Strong applicants will have completed chemistry, biology, and calculus in high school. Admission is for Autumn quarter only.
2. *Early Admission.* Students who are enrolled at the University are eligible to apply at the end of the freshman year if they have completed and earned at least a 2.50 GPA in the following courses: MATH 124, MATH 125, MATH 126, CHEM 142, CHEM 152, CHEM 162, and 5 credits of English composition. A 2.50 GPA guarantees consideration but does not guarantee admission. The application deadline is July 1 for autumn quarter admission.
3. *Upper Admission.* Upper admission requires 60 credits of coursework with at least a 2.50 GPA: MATH 124, MATH 125, MATH 126; CHEM 142, CHEM 152, CHEM 162; PHYS 121, PHYS 122; BIOL 180, BIOL 200; CSE 142; and 5 credits of English composition. A 2.50 GPA guarantees consideration but does not guarantee admission. Application deadlines for upper admission are February 1 for spring quarter and July 1 for autumn quarter. Consult the department's Web page or academic counselor for more details.

Graduation Requirements

Graduation requirements are subject to change. Current requirements are found on the departmental Web page. Students follow the requirements that are in effect at time of entry into the department. 180 credits as follows:

General Education Requirements (105 credits):

1. Areas of Knowledge: 24 total credits in Visual, Literary, and Performing Arts (VLP) and Individuals and Societies (I&S), with at least 10 credits in each area.
2. Written and Oral Communication (8 credits): 5 credits of English composition, from the approved University list; T C 231. Additional writing credits are built into the major core courses.
3. Mathematics (25 credits): MATH 124, MATH 125, MATH 126, MATH 307, MATH 308; STAT 390.
4. Natural Science (48 credits): CHEM 142, CHEM 152, CHEM 162, and CHEM 223 or CHEM 237; PHYS 121, PHYS 122, PHYS 123; BIOL 180, BIOL 200; BIOC 405.

Major Requirements (75 credits):

1. Engineering Fundamentals (17 credits): CHEM E 260; CSE 142, CSE 143; E E 215.
2. Bioengineering Core (38 credits): BIOEN 201, BIOEN 301, BIOEN 302, BIOEN 303, BIOEN 304, BIOEN 305, BIOEN 357; 12 credits of BIOEN 480.
3. Bioengineering Senior Electives (15 credits): Fifteen credits chosen from BIOEN 420, BIOEN 436; BIOEN 440, BIOEN 455, BIOEN 457, BIOEN 467, BIOEN 470, BIOEN 485, BIOEN 490, BIOEN 491, BIOEN 492.
4. Approved Electives (5 credits): Five additional credits chosen from an approved list of math, science, and engineering courses (see the department's Web page for further information), or from the Bioengineering senior elective list.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Bioengineering graduates have the ability to apply knowledge of mathematics, science, and engineering; the ability to design and conduct experiments, as well as to analyze and interpret data; the ability to design a system, component, or process to meet desired needs; the ability to function on multi-disciplinary teams; the ability to identify, formulate, and solve engineering problems; an understanding of professional and ethical responsibility; the ability to communicate effectively; the broad education necessary to understand the impact of engineering solutions in a global and societal

context; a recognition of the need for, and an ability to engage in, life-long learning; knowledge of contemporary issues; the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice; an understanding of biology and physiology; the capability to apply advanced mathematics (including differential equations and statistics), science, and engineering to solve the problems at the interface of engineering and biology; the ability to make measurements on and interpret data from living systems, addressing the problems associated with the interactions between living and non-living materials and systems.

- * *Instructional and Research Facilities:* The department maintains a general computing lab for bioengineering student use as well as an advanced computing lab for class instruction and student use. Offices and laboratories are located in the College of Engineering and the School of Medicine. Construction is underway on a new bioengineering building, which will offer expanded instructional laboratories, a student workroom, a seminar room, and other amenities. The Department of Bioengineering houses UWEB (University of Washington Engineered Biomaterials), participates in the Center for Nanotechnology, and sponsors many other research centers relating to our five thrust areas in Computational Bioengineering, Distributed Diagnosis and Home Healthcare, Engineered Biomaterials, Medical Imaging and Image-guided Therapy, and Molecular Bioengineering and Nanotechnology.
- * *Honors Options Available:* With College Honors. With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Many undergraduate bioengineers are involved in internships. The department participates in the College of Engineering Co-op Program and maintains an internship website for majors. Most summers the department sponsors one or more internships available to the general campus community.
- * *Department Scholarships:* Several scholarships are available for majors.
- * *Student Organizations/Associations:* The Undergraduate BioEngineering Society (UBES) organizes social events as well as events that support student interest in medical school, graduate school, and industry.

Of Special Note: Courses on technology commercialization are available to seniors.

Graduate Program

Graduate Program Coordinator
Box 357962
206-685-2000
bioeng@u.washington.edu

The Department of Bioengineering offers programs of study which lead to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees.

Master of Science

The Master of Science degree program provides breadth of knowledge of engineering, biology, and medicine, and depth of knowledge in a particular research area. The degree prepares students for careers in academic, industrial, or hospital environments.

Admission Requirements

All application materials must be received in the appropriate office by the deadline. International applications are due by December 1; domestic applications are due by January 15. No exceptions. Late and/or incomplete applications will not be reviewed.

- * Signed copy of the Graduate School Application
- * Department of Bioengineering Admissions Form
- * Potential Areas of Specialization form
- * Three letters of recommendation
- * One set of official transcripts

The departmental forms are all online. Please note that any materials sent in addition to those listed above are considered non-essential and do not enhance the application.

Applicants are expected to have the following courses as part of their undergraduate education: ordinary differential equations, linear algebra, signal analysis, probability theory and statistics, programming, electrical

engineering and physics, chemistry, materials science, rate processes and mathematics, and cell and molecular biology. Admitted students must be knowledgeable of these topics prior to entrance to the M.S. program.

Degree Requirements

Course Requirements for the M.S. in Bioengineering are detailed below. All core and elective courses must be taken for a numerical grade. Students must complete a one-quarter teaching assistantship. The timing of the teaching assistantship is decided in consultation with the department and the faculty adviser.

Note: A single course may not count for two separate requirements.

36 credits as follows:

- * Molecular Bioengineering: BIOEN 501 (4)
- * Cellular Bioengineering: BIOEN 502 (4)
- * Systems Bioengineering: BIOEN 503 (4)
- * Biostatistics (4 credits)
- * Bioengineering seminar: BIOEN 510 (1)
- * Bioengineering elective courses, chosen in consultation with faculty advisor: 10 credits
- * Master's thesis: BIOEN 700 (9 credits)

Doctor of Philosophy

The objective of the Ph.D. program is to train individuals for careers in bioengineering research and teaching. The program has three major objectives: (1) breadth of knowledge about engineering, biology, medicine, and the interdisciplinary interface between these different fields; (2) depth of knowledge and expertise in a particular scientific specialty; (3) demonstrated independence as a bioengineering researcher. These objectives are fulfilled through a combination of educational and research experiences. The program is rigorous but maintains flexibility to accommodate qualified students from diverse academic backgrounds. Entrance to the Ph.D. program does not require prior completion of the M.S. degree and may be made directly after the B.S. An optional dual Ph.D. degree in bioengineering and nanotechnology is available. See www.nano.washington.edu for more information.

Admission Requirements

See the application process detailed in the M.S. section.

While it is not required to complete an MS degree before beginning the Ph.D., every graduate student is expected to have the following courses as part of their undergraduate education: ordinary differential equations, linear algebra, signal analysis, probability theory and statistics, programming, electrical engineering and physics, chemistry, materials science, processes and mathematics, and cell and molecular biology. Admitted students must be knowledgeable of these topics prior to entrance to the Ph.D. program.

Degree Requirements

The Ph.D. program consists of a rigorous set of core courses, elective courses, and a focused research project. Three major milestones punctuate that work: the Qualifying Examination, the General Examination, and the Final Examination (dissertation defense). Additionally, students must complete a one-quarter teaching assistantship. The timing of the teaching assistantship is decided in consultation with the department and the faculty advisor.

All core and thrust courses must be taken for a numerical grade. A single course may not count for two separate requirements. 60 credits beyond the M.S., as follows:

- * Molecular Bioengineering: BIOEN 501 (4)
- * Cellular Bioengineering: BIOEN 502 (4)
- * Systems Bioengineering: BIOEN 503 (4)
- * Biostatistics (4)
- * Bioengineering seminar: BIOEN 510 (1)
- * 16 credits of bioengineering elective courses, chosen in consultation with faculty advisor
- * 27 credits of dissertation writing (BIOEN 800)

Ordinarily, a student progressing well and on schedule will achieve the following:

- * *First Year:* complete several lab rotations and select a thesis advisor no later than the end of spring quarter.
- * *Second Year:* pass the Qualifying Exam and form a Supervisory Committee by the end of the second year.
- * *Third Year:* pass the General Exam.
- * *Fourth Year (and subsequent years):* make an annual progress report to and receive feedback from the Supervisory Committee.
- * *Fifth Year:* defend the dissertation.

Medical Scientist Program

A Medical Scientist Training Program exists for the support of individuals interested in coordinated graduate school/medical school study leading to both the M.D. and Ph.D. degrees. Students entering this highly competitive program are given an opportunity to pursue a flexible, combined course of study and research. Early inquiry is essential for this option. Contact the MSTP office at 206-685-0762.

Research Facilities

Offices and laboratories are located in the College of Engineering and the School of Medicine. Students have access to the University of Washington Medical Center, Vivarium, Primate Center, Computer Center, and libraries, as well as to all engineering and health-sciences departments and facilities. A wide range of technologies and virtually all aspects of biomedical science are available.

Financial Aid

Financial aid is available to qualified graduate students in the form of traineeships, fellowships, and teaching and research assistantships. Funding is derived from federal research and training programs, the Graduate School Fund for Excellence and Innovation, and programs sponsored by private agencies. Questions regarding financial support may be directed to the Academic Counselor.

Course Descriptions

See page 538.

Chemical Engineering

105 Benson

Chemical engineering is concerned with processes for transforming raw materials into energy and into a great variety of consumer products, such as gasoline, electronic materials, pulp and paper, fertilizers, rubber, polymers and composites, and pharmaceuticals. Chemical engineers work on research and development of these materials and on the processes for making them, as well as on the design and operation of chemical plants and equipment by which production is achieved. This must be done with efficiency, economy, and concern for society and the environment.

Undergraduate Program

Adviser
105 Benson, Box 351750
206-543-2252
advising@cheme.washington.edu

The Department of Chemical Engineering offers the following program of study:

- * The Bachelor of Science in Chemical Engineering degree. This degree program is accredited by the Accreditation Board for Engineering and Technology (ABET).

Bachelor of Science in Chemical Engineering

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126, MATH 307, CHEM 142, CHEM 152, CHEM 162, CHEM 237, PHYS 121, PHYS 122, PHYS 123, ENGL 131 (or equivalent), CSE 142, CHEM E 260.

Department Admission Requirements

Applicants are considered in two groups -- Early Admission and Upper-Division Admission. Admission is competitive. Thus, completion of minimum requirements described below does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision. Applications are accepted for autumn quarter only; application deadline is July 1. The application is available at www.engr.washington.edu/uappl.

1. Early Admission
 - a. Course requirements: MATH 124, MATH 125, MATH 126; CHEM 142, CHEM 152, CHEM 162; PHYS 121; and 5 credits of English composition. All courses must be completed prior to the July 1 application deadline.
 - b. Applicants must be completing their freshman year at the UW and must have completed a minimum of 15 credits taken in residence at the UW.
 - c. Grade requirements: A minimum grade of 2.0 in each prerequisite course and a minimum GPA of 2.50.
2. Upper-Division Admission
 - a. Course requirements: MATH 124, MATH 125, MATH 126, MATH 307 (18 credits); CHEM 142, CHEM 152, CHEM 162, CHEM 223 or CHEM 237 (20); PHYS 121, PHYS 122, PHYS 123 (15), CSE 142, CHEM E 260 (8); and one 5-credit English composition course. In addition, it is strongly recommended that students complete CHEM 224 or CHEM 238.
 - b. 75 credits completed by July 1 application deadline, with a minimum overall 2.50 GPA and minimum 2.0 in all courses required for admission.
 - c. Students with a GPA lower than 2.50 for these specified courses or an overall GPA lower than 2.50 for all courses applicable to the B.S.Ch.E. degree seldom succeed in the department. Historically, a GPA of 2.80 or higher in these categories is required for admission to and success in the department.
 - d. Factors included in the admissions decision include the course record as indicated above and qualitative considerations such as difficulty of completed courses, frequency of incomplete or withdrawal grades, number of repeated courses, applicable work experience and maturity of attitude, record of honors, a demonstrated ability to take at least 12 credits per quarter, and special circumstances disclosed by the applicant.

Graduation Requirements

180 credits, as follows:

General Education Requirements (114 credits)

1. Written and Oral Communications (12 credits): one 5-credit English composition course from the University list; T C 231; T C 333 (or department-approved alternative).
2. Visual, Literary, & Performing Arts (VLPA) and Individuals & Societies (I&S) (24 credits): A minimum of 10 credits required in each area.
3. Natural World (78 credits)
 - a. Physics (15 credits): PHYS 121, PHYS 122, PHYS 123Ph
 - b. Mathematics (24 credits): MATH 124, MATH 125, MATH 126, MATH 307, MATH 308, and MATH 309 (or MATH 390 or IND E 315)
 - c. Chemistry (39 credits): CHEM 142, CHEM 152, CHEM 162, CHEM 237, CHEM 238, CHEM 455, CHEM 457, CHEM 461, and 6 credits of chemistry electives

Major Requirements (61 credits)

1. Engineering Fundamentals (8 credits): CHEM E 260; CSE 142
2. Chemical Engineering Core Courses (43 credits): CHEM E 310, CHEM E 326, CHEM E 330, CHEM E 340, CHEM E 435, CHEM E 436, CHEM E 437, CHEM E 465, CHEM E 480, CHEM E 485, CHEM E 486
3. Engineering Elective Courses (10 credits)

Unspecified Electives (5 credits)

A minimum GPA of 2.00 in chemical engineering courses, based on the first time each course is taken, is required for graduation.

Many engineers design new equipment and processes or design modifications to them. The design experience is integrated throughout the curriculum, with open-ended problems (sometimes involving economic constraints) in several courses: design of heat exchangers (CHEM E 340) and distillation towers (CHEM E 435), design of piping and pumping systems (CHEM E 330), design of chemical reactors (CHEM E 465). The design experience culminates in two capstone design courses (CHEM E

485 and 486 or 497) which involve the design of an integrated chemical system. An optional 9-credit specialty area allows each student to develop special competence in a selected subject by taking a minimum of three courses in that area. Engineering and free electives may be used for this purpose. The areas are biotechnology; fuel cells and energy; polymers, composites, colloids, and interfaces; computers applied to chemical engineering; electronic materials; environmental engineering; and nuclear engineering.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Chemical engineering graduates possess knowledge (including safety and environmental aspects) of material and energy balances applied to chemical processes; thermodynamics of physical and chemical equilibria; heat, mass, and momentum transfer; chemical reaction engineering; continuous and stage-wise separation operations; process dynamics and control; and process design. They also gain ability to apply knowledge of mathematics, science, and engineering; ability to design and conduct experiments, as well as to analyze and interpret data; ability to design a system, component, or process to meet desired needs; ability to function on multidisciplinary teams; and ability to identify, formulate, and solve engineering problems. They also possess an understanding of professional and ethical responsibility; an ability to communicate effectively; the broad education necessary to understand the impact of engineering solutions in a global and societal context; a recognition of the need for, and an ability to engage in, life-long learning; a knowledge of contemporary issues; and an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- * *Instructional and Research Facilities:* The chemical engineering building, Benson Hall, contains classrooms, offices, stockrooms, computer rooms, machine and electronics shops, and laboratories. The Unit Operations Lab holds a variety of experiments designed to give undergraduate students the experience of using real chemical process equipment and to deepen their understanding of chemical engineering fundamentals of fluid flow, heat transfer, separation processes, and reactor behavior. Departmental computer facilities include a network of PCs located in a keyed room for the exclusive use of chemical engineering students. Ten of these machines have hardware for computer data acquisition (to collect experimental data and support experiments on process automation). All have fast connections to the Internet and to larger UW computers.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Students are encouraged to participate in internships, which are generally facilitated through the Engineering Co-op Office.
- * *Department Scholarships:* The department awards 25-30 full-tuition scholarships per year. Application deadline is April 1.
- * *Student Organizations/Associations:* The undergraduates in the department run a dynamic chapter of the American Institute of Chemical Engineers.

Of Special Note: Entrance into most chemical engineering courses is ordinarily limited to majors in chemical engineering, paper science, and the B.S.E. program. Other students who wish to take departmental courses must meet the prerequisites and obtain instructor approval (except for CHEM E 485 and CHEM E 486, which are open to majors only).

Graduate Program

Graduate Program Coordinator
105 Benson, Box 351750
206-543-2250
grad.admissions@cheme.washington.edu

The department offers studies leading to the degrees of Doctor of Philosophy, Master of Science in Chemical Engineering, and Master of Science in Engineering. The doctoral degree is centered on the dissertation with a foundation in course work; it is generally completed in four to five years beyond the baccalaureate degree. In the master's program primary emphasis is placed on course work, and the degree generally requires 21 months of study. Thesis and non-thesis options are available.

The program of study includes basic subjects of importance to all chemical engineers, such as thermodynamics, transport phenomena, kinetics, and applied mathematics. In addition, students are invited to take more-specialized courses in chemical engineering or in other departments. Students usually take three courses during their first quarter. In subsequent quarters, less time is spent on course work, and more on research and independent study.

The department has about seventy full-time graduate students, most of whom are working toward a doctorate. They study and collaborate with faculty members in an atmosphere that is informal, friendly, and intellectually vigorous. Faculty interests are broad, so students become familiar with a variety of areas while receiving individual guidance in a specialty.

Master of Science in Chemical Engineering

Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for graduate admission have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements. To be competitive, applicants must be:

- * Highly ranked (top 5%) in a respected chemical engineering program.
- * Score at least 750 on the quantitative portion of the GRE.
- * Score at least 600 (paper-based) or 250 (computer-based) on the TOEFL, if an International applicant.

Degree Requirements

Thesis Option

39 credits as follows:

- * 30 credits of course work. Of these, 18 credits must be in courses numbered 500-599, of which at most 3 may be seminar credits, such as CHEM E 523. Numerical grades must be received for at least 18 credits of course work. These must be 500-599 or approved 400-level courses. They must include five courses from at least four of the following five categories:
 - o Math/Computer/Statistics: CHEM E 475 (3), CHEM E 481 (3), CHEM E 482 (3), CHEM E 510 (4), CHEM E 512 (3), CHEM E 575 (3), CHEM E 582 (3), CHEM 526 (3, max. 9), STAT 421 (4)
 - o Thermodynamics: CHEM E 455 (1/3, max. 3), CHEM E 525 (4), CHEM E 526 (3), CHEM 552 (3)
 - o Transport Phenomena: CHEM E 530 (4), CHEM E 531 (3), CHEM E 532 (3), CHEM E 533 (3), M E 533 (3), M E 534 (3)
 - o Reaction Phenomena: CHEM E 461 (3), CHEM E 560 (3), CHEM E 564 (3), CHEM E 565 (3)
 - o Materials and Biotech: CHEM E 450 (3), CHEM E 467 (3), CHEM E 477, CHEM E 554 (3), CHEM E 555 (4), CHEM E 556 (3/4), CHEM E 558 (3), CHEM E 559 (3), CHEM E 570 (3, max. 6), CHEM E 571 (3), CHEM E 572 (3), CHEM E 590 (3)
- * Approved 400-level courses presented for the 18-graded credits include 400-level CHEM E courses not required for the B.S. degree and 400-level non-CHEM E courses approved by the Graduate Program Coordinator.
- * 12 credits of electives (at least 3 credits must be graded).
- * A minimum cumulative GPA of 3.00 in the graduate program.
- * At least 30 credits must be taken at the UW.
- * Submit a thesis describing original research. At least 9 credits of thesis credits are required (CHEM E 700).
- * Pass a Final Exam consisting of an oral presentation of the thesis.
- * Serve as TA for at least one quarter.

Non-Thesis Option

The non-thesis allows a student to receive graduate-level training with the primary focus on course work. The degree requirements can be completed in four quarters (completion in three is possible).

39 credits, as follows:

- * 18 credits must be in courses numbered 500-599, of which at most 3 may be seminar credits, such as CHEM E 523. Numerical grades must be received for at least 18 credits of course work. These must be 500-

599 or approved 400-level courses. They must include five courses from at least four of the following five categories:

- o Math/Computer/Statistics: CHEM E 475 (3), CHEM E 481 (3), CHEM E 482 (3), CHEM E 510 (4), CHEM E 512 (3), CHEM E 575 (3), CHEM E 582 (3), CHEM 526 (3, max. 9), STAT 421 (4)
 - o Thermodynamics: CHEM E 455 (1/3, max. 3), CHEM E 525 (4), CHEM E 526 (3), CHEM 552 (3)
 - o Transport Phenomena: CHEM E 530 (4), CHEM E 531 (3), CHEM E 532 (3), CHEM E 533 (3), M E 533 (3), M E 534 (3)
 - o Reaction Phenomena: CHEM E 461 (3), CHEM E 560 (3), CHEM E 564 (3), CHEM E 565 (3)
 - o Materials and Biotech: CHEM E 450 (3), CHEM E 467 (3), CHEM E 477, CHEM E 554 (3), CHEM E 555 (4), CHEM E 556 (3/4), CHEM E 558 (3), CHEM E 559 (3), CHEM E 570 (3, max. 6), CHEM E 571 (3), CHEM E 572 (3), CHEM E 590 (3)
- * Approved 400-level courses presented for the 18-graded credits include 400-level CHEM E courses not required for the B.S. degree and 400-level non-CHEM E courses approved by the Graduate Program Coordinator.
 - * 12 credits of electives (at least 3 credits must be graded).
 - * Satisfactory completion of 6-9 CHEM E 600 credits (i.e., with a numerical grade of 2.7 or above, or an S grade). A member of the Chem E graduate faculty must supervise and grade the work. A written report is required. Thesis research (i.e., CHEM E 700 or 800) cannot count toward the 39 credits.
 - * A minimum cumulative GPA of 3.00 in the graduate program.
 - * At least 30 credits must be taken at the UW.
 - * Pass a Final Exam consisting of an oral presentation of the CHEM E 600 project

Master of Science in Engineering

Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for graduate admission have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements.

To be competitive, applicants must be:

- * Highly ranked (top 5%) in a respected chemical engineering program.
- * Score at least 750 on the quantitative portion of the GRE.
- * Score at least 600 (paper-based) or 250 (computer-based) on the TOEFL, if an International applicant.

Degree Requirements

Minimum 72 credits of coursework. The minimum requirements are the same as for the MS Ch E thesis option, except that the research advisor considers the student's background and research objectives and tailors the course requirements accordingly (subject to GPC approval). As the degree title would suggest, there is usually less emphasis on traditional chemical engineering, more on engineering science and related subjects.

Doctor of Philosophy

Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for graduate admission have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements.

To be competitive, applicants must be:

- * Highly ranked (top 5%) in a respected chemical engineering program.
- * Score at least 750 on the quantitative portion of the GRE.
- * Score at least 600 (paper-based) or 250 (computer-based) on the TOEFL, if an International applicant.

Degree Requirements

90-108 credits, as follows:

- * Minimum Graduate School Requirements: You must satisfy the Graduate School minimum requirements, summarized below. NOTE: Graduate School policy requires you to satisfy the requirements in force at the time of graduation (not when you entered the degree program). Check their web site periodically to make sure you're current on the requirements.
 - o Complete at least 18 credits of courses numbered 500-600 at the University of Washington.
 - o Complete at least 18 numerically graded credits of 400- and 500-level UW courses prior to the General Examination. These 400-level courses must have departmental approval.
 - o Complete a minimum of 90 credits, at least 60 of which are UW credits.
 - o Compile a minimum of 27 dissertation credits (CHEM E 800) over a period of at least three quarters. With the exception of summer, students may take a maximum of 10 dissertation credits per quarter.
 - o Maintain a minimum cumulative GPA of 3.00.
 - o Pass the General Examination.
 - o Pass the Final Examination (includes approval of the dissertation by your supervisory committee).
 - o Maintain full- or part-time graduate student registration at the UW for the quarter in which the above examinations are completed and the degree is conferred.
 - o Complete all work for the doctoral degree within ten years.
- * Students having a chemical engineering undergraduate degree: In addition to the minimum Graduate School requirements listed above, doctoral students must:
 - o Serve as a TA for at least three quarters. Students should plan on one quarter per year in years 2-4.
 - o Complete at least six graded courses numbered 500-599 or approved 400-level courses to satisfy the following:
 - + Five courses from at least four of the following five categories:
 - # Math/Computer/Statistics: CHEM E 475 (3), CHEM E 481 (3), CHEM E 482 (3), CHEM E 510 (4), CHEM E 512 (3), CHEM E 575 (3), CHEM E 582 (3), CHEM E 526 (3, max. 9), STAT 421 (4)
 - # Thermodynamics: CHEM E 455 (1/3, max. 3), CHEM E 525 (4), CHEM E 526 (3), CHEM E 552 (3)
 - # Transport Phenomena: CHEM E 530 (4), CHEM E 531 (3), CHEM E 532 (3), CHEM E 533 (3), M E 533 (3), M E 534 (3)
 - # Reaction Phenomena: CHEM E 461 (3), CHEM E 560 (3), CHEM E 564 (3), CHEM E 565 (3)
 - # Materials and Biotech: CHEM E 450 (3), CHEM E 467 (3), CHEM E 477, CHEM E 554 (3), CHEM E 555 (4), CHEM E 556 (3/4), CHEM E 558 (3), CHEM E 559 (3), CHEM E 570 (3, max. 6), CHEM E 571 (3), CHEM E 572 (3), CHEM E 590 (3)
 - + One CHEM E course in a topic outside the student's main research area.
- * Non-Chemical Engineering undergraduates: Students whose undergraduate degree is in engineering or science (e.g., B.S. in Chemistry or Materials Science) but not Chemical Engineering must pass the following courses in addition to the requirements listed in the previous section: CHEM E 330 (4), CHEM E 340 (4), CHEM E 435 (4), CHEM E 465 (4), CHEM E 485 (4). Students lacking a strong background in thermodynamics are advised (but not required) to take CHEM E 326 (4) prior to attempting CHEM E 525 (4). It is possible to take some graduate courses while completing the required undergraduate courses.

Research Facilities

The department is fortunate to have outstanding facilities. Benson Hall contains classrooms, offices, stockrooms, a machine shop, laboratories, and a variety of specialized research equipment. Each graduate student is provided desk space in a small laboratory or office as well as access to larger laboratories in the building. Students also may use the services of the Academic Computer Center, instrument-making shops, research centers (e.g., biomaterials, nanotechnology, chemical analysis), and the Chemistry and Engineering Libraries.

Admission Requirements

A student is accepted for admission to the Graduate School as a chemical engineering major by joint action of the Graduate School and the department after consideration of a formal application. Most students applying for graduate admission have a Bachelor of Science degree in chemical engineering. If a student has an undergraduate degree in chemistry, physics, mathematics, or another branch of engineering, he or she may obtain a graduate degree in chemical engineering by meeting certain additional requirements.

Financial Aid

The department has various sources of support for qualified graduate students. Those interested in applying for admission and support should visit the department's Web site at depts.washington.edu/chemeng/. The completed forms and reference letters should be received in the department office by January 15. Offers of admission with financial support are usually made in January through March.

Course Descriptions

See page 494.

Civil and Environmental Engineering

201 More

Civil and environmental engineering is a profession which interfaces closely with society in the planning, design, construction, and management of facilities serving the needs of people. These activities include all transportation modes: highways, aerospace, rivers, and harbors; water resources, hydraulics, and coastal engineering; structures, mechanics, and geotechnical engineering; surveying, mapping, and photogrammetry; urban planning and development; water supply, wastewater treatment, and water-quality management; solid- and hazardous-waste disposal; and quality control and management of the air resources.

A civil engineer may specialize in one or several of these activities and may further specialize in a particular function, such as design or management. The work frequently provides close associations with the legal profession, urban and regional planners, economists, public officials, biologists, chemists, financial consultants, architects, and system analysts. Education and practice require a consideration not only of the technological-science aspects of a particular problem but also of its relationship to social, economic, political, and environmental constraints.

To accommodate these wide interests, the department is organized into six academic areas: construction management; transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

Undergraduate Program

Adviser
201 More, Box 352700
206-543-5092
ceadvice@u.washington.edu

The Department of Civil and Environmental Engineering offers the following program of study:

* The Bachelor of Science in Civil Engineering degree

Bachelor of Science in Civil Engineering

Suggested First- and Second-Year Courses: MATH 124, MATH 125, MATH 126; CHEM 142, CHEM 152; PHYS 121; CSE 142; English composition.

Department Admission Requirements

1. Admission to the department is usually at the junior level. Admission is competitive. Thus, completion of minimum requirements described below does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision. Applications are accepted for autumn quarter only; application deadline is July 1. See department office for admission application.
2. The primary admission criterion is probable success in the engineering degree program as evidenced by academic performance, work experience, and other factors.
3. Completion of the following courses with a minimum grade of 2.0 in each course and a minimum cumulative GPA of 2.50: MATH 124, MATH 125, MATH 126, MATH 308; CHEM 142; PHYS 121, PHYS 122; CSE/ENGR 142; A A 210; CEE 220; M E 230; and 5 credits of English composition.

4. Prospective students should read the information on prerequisite courses and application procedures on the department Web site. Applications are accepted through the College of Engineering online application form.

Graduation Requirements

180 credits as follows:

1. General Education Requirements (85-87 credits)
 - a. Written and Oral Communications (8 credits): English composition (5); TC 231 (3)
 - b. Visual, Literary, and Performing Arts (VLPA) and Individuals & Societies (I&S) (24 credits): A minimum of 10 credits in VLPA and a minimum of 10 credits of I&S plus 4 additional credits in either area.
 - c. Economics (4-5 credits): ECON 200 or IND E 250. ECON 200 may also be applied toward the I&S requirement. IND E 250 may also be applied toward the requirement for an additional Engineering Fundamentals course.
 - d. Natural World (49-50 credits)
 - i. Mathematics (21 credits): MATH 124, MATH 125, MATH 126, MATH 307 (or AMATH 351), MATH 308 (or AMATH 352)
 - ii. Statistics (3-4 credits): IND 315 (preferred) or STAT 390
 - iii. Science (25 credits): CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123
2. Major Requirements (94 credits)
 - a. Engineering Fundamentals (19 credits): CSE 142, A A 210, CEE 220, and ME 230. Students who complete STAT 390 must complete an additional Engineering Fundamentals course from CHEM E 260, IND E 250, IND E 280, M E 123, or MSE 170. Students who complete IND E 315 must complete either an additional Engineering Fundamentals course from the above list, or an additional 300-level math course other than statistics.
 - b. Civil Engineering Core (45 credits): CEE 306, CEE 316, CEE 320, CEE 342, CEE 345, CEE 350, CEE 363, CEE 366, CEE 379, CEE 380, CEE 390, CEE 391, CEE 392
 - c. Comprehensive Design (6 credits): CEE 440 and one course from CEE 441, CEE 442, CEE 443, CEE 444, or CEE 445
 - d. Civil Engineering Technical Electives (15 credits): A minimum of 12 credits of CEE 400-level coursework selected from an approved list, with at least one core course from four separate areas of concentration within Civil Engineering. Plus any additional CEE 400-level course (except CEE 423 and courses taken to fulfill requirement c, above).
 - e. Upper Division Engineering and Science (9 credits): Choice of additional CEE 400-level courses or courses from an approved list from outside the department.
 - f. Grade Requirements: Minimum 2.00 GPA in all engineering courses with no grade below 1.0 in these courses.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Upon completion of the undergraduate program, students can demonstrate proficiency in applying fundamental mathematical, statistical, scientific, and engineering principles in formulating and solving civil engineering problems; demonstrate sufficient mastery of core civil engineering topics suitable for entry into the profession and for graduate study; gain significant experience in designing systems and components in civil and environmental applications in both individual and team contexts; possess up-to-date skills for analysis, data collection, modeling, project management, professional development, communication, and presentation; and develop an understanding of professional and social issues suitable for participation and leadership in their communities.
- * *Instructional and Research Facilities:* The department has a large and modern computer laboratory as well as substantial research laboratory facilities. The environmental science and hazardous waste research laboratory facilities include more than 7,000 sq. ft. of lab space, well equipped with sophisticated research instruments. The lake-stream laboratory is equipped with limnological equipment, as well as an autoanalyzer, bench-top incubators, and research microscopes. The structural research laboratory contains an earthquake simulator, a modern MTS testing system, and a 2.4 million lb. capacity Baldwin universal hydraulic testing machine. The geotechnical engineering laboratory contains soil testing equipment, including triaxial testing devices, a microcomputer-controlled GDS pressure control system, a Bishop-Wesley cell, a recently developed cuboidal shear device, a CKC cyclic triaxial device, and a SBEL (Stokoe) resonant column.
- * *Honors Options Available:* With College Honors. With Departmental Honors. See adviser for details.

* *Research, Internships, and Service Learning:* Students typically work at internships in private companies and government agencies in the summer after their junior year, with some part-time internships continuing during the academic year. Many companies advertise internship and job openings through the department and meet with students for on-campus recruiting sessions.

* *Department Scholarships:* The department offers twenty or more scholarships a year. Scholarship applications are available on the College of Engineering Web site and are accepted once a year on April 1. Sophomores may apply for a scholarship before being formally admitted. In addition to departmental scholarships, several companies and private agencies advertise scholarships throughout the year.

* *Student Organizations/Associations:* American Society of Civil Engineers, Chi Epsilon, national honor society for civil engineering undergraduate and graduate students. See adviser for details.

Graduate Program

Graduate Program Coordinator
201 More, Box 352700
206-543-2574

The Department of Civil and Environmental Engineering offers courses leading to the degrees of Master of Science in Civil Engineering and Doctor of Philosophy. The department also provides authorized options leading to the College-wide Master of Science and Master of Science in Engineering degrees.

The three master's programs are intended to accommodate the needs of three categories of students: the M.S.C.E. degree is for those who have completed an undergraduate degree in civil engineering and plan to continue with their professional training; the College-wide M.S.E. degree is for other engineering graduates who wish to do graduate work in civil and environmental engineering; and the College-wide M.S. degree is for those whose Bachelor of Science degrees are not in engineering, but who desire to apply their training in science to the solution of problems in some specific sector related to civil and environmental engineering. The non-engineer may be required to take additional course work to obtain an M.S.E. degree.

Graduate work is offered in most fields of civil and environmental engineering, including transportation engineering; geotechnical engineering; structural engineering and mechanics; environmental engineering; and water resources, hydrology, and hydraulic systems.

Master of Science in Civil Engineering

Admission Requirements

Priority for admission is based on an applicant's apparent ability to progress satisfactorily in a graduate degree program. The applicant's scholastic record is of major importance; usually, at least a "B" or 3.00 GPA in the junior and senior years is required. Consideration is also given to Graduate Record Examination scores and other information.

Degree Requirements

42 credits, as follows:

Three options are available -- thesis, non-thesis, and internship. All three options allow for strong flexibility in coursework so that the student may individualize the coursework to an area of research, determined in conjunction with the faculty adviser.

- * Thesis option:
 - o 30 credits of coursework with at least 15 credits at the 500 level
 - o 3 credits (maximum) of CEE 500
 - o 9 credits of master's thesis, CEE 700
- * Non-thesis option:
 - o 36 credits of coursework with at least 18 credits at the 500 level
 - o 3 credits (maximum) of CEE 500
 - o 3 credits (maximum) of CEE 600 with a minimum grade of 3.0
- * Internship option:
 - o 30 credits of coursework with at least 15 credits at the 500 level
 - o 3 credits (maximum) of CEE 500
 - o 3 credits (maximum) of CEE 600 with a minimum grade of 3.0
 - o 6 credits of internship, CEE 601

Doctor of Philosophy

Admission Requirements

Priority for admission is based on an applicant's apparent ability to progress satisfactorily in a graduate degree program. The applicant's scholastic record is of major importance; usually, at least a "B" or 3.00 GPA in the junior and senior years is required. Consideration is also given to Graduate Record Examination scores and other information.

Degree Requirements

90 credits, as follows:

- * Students with Master's degree from outside U.W. or from outside CEE department or Ph.D. topic area:
 - o Master's degree credit waiver (30 credits)
 - o Numerically graded credits (30 credits)
 - o Dissertation (27 credits)
 - o CEE seminar (3 credits)
- * Students with UW CEE Master's degree in Ph.D. topic area:
 - o Numerically graded credits from Master's degree plus Ph.D. graded credits (63 credits)
 - o Dissertation (27 credits)

With the approval of the department, an appropriate master's degree from an accredited institution may be applied towards 30 of the 90 quarter credits.

Because the degree is a research-based degree, course requirements are individualized depending on student's background and Ph.D. topic area.

Financial Aid

Research and teaching assistantships are available on a competitive basis. The number of positions depends upon the current level of funding. Additionally, there are a limited number of fellowships, scholarships, and traineeships.

Research Facilities

More Hall has structural, concrete, bituminous materials, soil mechanics, computer, water-quality, solid-wastes, and air-quality laboratories as well as an air-monitoring station and equipment for fieldwork in the construction, water, air, and solid-waste programs. Facilities for experimental studies in hydraulics and coastal engineering and in fluid mechanics are located in the Harris Hydraulics Laboratory.

Course Descriptions

See page 496.

Computer Science and Engineering

AC101 Paul G. Allen Center for Computer Science and Engineering

Computer science is the study of information and algorithms within the context of real and abstract computing devices. Computer scientists are interested in such topics as the representation and storage of information; algorithms to access, display, edit, and transform information; programming languages to express algorithms; and hardware and software processors to execute algorithms. These concerns lead to practical developments in computer systems software, such as operating systems and compilers; in application areas, such as artificial intelligence, computer graphics, and computational biology; and also to theoretical investigations of computers, algorithms, and data.

Computer engineering is a closely related field concerned with the design and practical application of computer hardware and software systems to the solution of technological, economic, and societal problems. The computer engineer analyzes a problem and selects from a variety of tools and technologies those most appropriate for its solution. A computer engineer can expect to be involved in hardware design, software creation, and systems integration.

Undergraduate Program

Adviser

101 Paul G. Allen Center for Computer Science and Engineering, Box 352350
206-543-1695
ugrad-advisor@cs.washington.edu

The Department of Computer Science and Engineering offers the following programs of study:

- * The Bachelor of Science in Computer Engineering degree
- * The Bachelor of Science degree with a major in computer science (see Computer Science section)

The core requirements of the two undergraduate majors are identical. The computer engineering major may be more appropriate for students who are interested in creating and building systems that include both hardware and software components and that must be engineered to meet a variety of cost and performance constraints. The program includes a general foundation in engineering fundamentals to enable interdisciplinary work with other departments in the College of Engineering and the University as a whole.

The computer science major may be more appropriate for students who want to earn a double major with another College of Arts and Sciences program (for example, mathematics or economics), who want the additional flexibility of the computer science requirements (the computer engineering major has more required courses and fewer electives), or who may be more interested in the theory, design, and implementation of software systems and applications (for example, the techniques of modern compilers or the algorithms behind computer graphics and animation).

Bachelor of Science in Computer Engineering

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122; CSE 142, CSE 143; English composition.

Department Admission Requirements

Applicants are considered in two groups -- Direct Admission and Upper-Division Admission. Admission is competitive. Completion of minimum requirements does not guarantee admission.

1. *Direct Admission:* Computer Science and Engineering enrolls up to 20 percent of its incoming class directly out of high school, prior to completion of university-level prerequisites. Freshman applicants to the University listing Computer Science or Computer Engineering as their intended major are automatically considered. Competitive applicants will have taken calculus and at least one year of laboratory science (preferably physics) upon entering the University. Admission is for autumn quarter only.
2. *Upper-Division Admission*
 - a. Course requirements: MATH 124, MATH 125, MATH 126 (or MATH 134, MATH 135, MATH 136), PHYS 121, PHYS 122, CSE 142, CSE 143, and at least 5 credits of English composition.
 - b. Admission is for autumn or spring quarter. Application deadlines are July 1 for autumn quarter and February 1 for spring quarter.

Graduation Requirements

180 Credits as follows:

General Education Requirements (81-84 credits)

1. Written and Oral Communication (12 credits): 5-credit course in English composition from the University-approved list; T C 231; T C 333, or department-approved alternative.
2. Visual, Literary, and Performing Arts (VLPA) and Individuals and Societies (I&S) (30 credits): A minimum of 10 credits in each required area.
3. Natural World (39-42 credits):
 - a. Mathematics (19-22 credits): MATH 124, MATH 125, MATH 126, (or MATH 134, MATH 135, MATH 136); MATH 308 or MATH 318 (waived if MATH 136 taken); MATH/STAT 390 or STAT 391.
 - b. Science (20 credits): PHYS 121, PHYS 122, and 10 additional credits from the list of approved natural science courses in the CS&E Handbook. Courses that meet the department's science requirement

include any course in biology, chemistry, physics, earth and space sciences, astronomy, or atmospheric sciences that requires PHYS 121 or CHEM 142/CHEM 145 as a prerequisite.

Major Requirements (96-98 credits)

1. Required Courses (44 credits): CSE 142, CSE 143, CSE 321, CSE 322, CSE 326, CSE 341, CSE 370, CSE 378, CSE 451, CSE 461; E E 215
2. Hardware Specialization (27 credits): E E 233; CSE 466, CSE 467; and 9 credits from courses on the approved senior elective course list in the CS&E Handbook.
3. Software Specialization (25-27 credits): CSE 403; two from CSE 401, CSE 421, CSE 444, CSE 471; and 10 credits from courses on the approved senior elective course list in the CS&E Handbook.
4. Transfer students must earn a minimum of 24 graded credits toward the major at the UW.

Student Outcomes and Opportunities

- * **Learning Objectives and Expected Outcomes:** The program provides an in-depth education in computer engineering while retaining strong foundations in traditional electrical engineering and computer science. The computer engineering program involves digital hardware, software, and architecture. Mathematics, engineering design, laboratory work, and communication-skills development are emphasized. A capstone design course applies the knowledge and skills collected during the program to a major team project

The computer science field has a broad base of private- and public-sector jobs suitable for the Bachelor of Science graduate: systems analyst, systems programmer, applications programmer, technical sales and marketing, and hardware or software engineering specialist. In addition, there are jobs for which graduate education may be appropriate: producers and developers of computer systems, and teachers and researchers. The field is also highly valued for practicing entrepreneurship and is considered one of the most vibrant in the sciences.

- * **Instructional and Research Facilities:** In autumn 2003 the department moved to the new state-of-the-art Paul G. Allen Center for Computer Science and Engineering. The Allen Center includes more than 20,000 square feet of laboratories, nearly 1,000 computer systems, and more than 50 terabytes of storage. Gigabit connectivity is provided to every desktop by more than 60 miles of data cabling, and wireless access is available throughout the building.

CSE general-purpose laboratories support the diverse set of hardware and software platforms required for a cutting-edge education in the field. CSE special-purpose laboratories provide tailored support for activities such as mobile robotics, computer graphics, digital design, motion capture, embedded systems, laser scanning, educational technology, networking, and artificial intelligence.

The Allen Center is one of the finest computer science and computer engineering facilities in the nation. All of its capabilities are available to all CSE students.

- * **Honors Options Available:** With College Honors. With Distinction. See adviser for details.
- * **Research, Internships, and Service Learning:** Internships and co-op opportunities are available for computer science undergraduates. See <http://www.engr.washington.edu/coop> and <http://depts.washington.edu/careers> for information.
- * **Departmental Scholarships:** CSE has a limited number of scholarships available to current CSE majors. Scholarship information is listed at www.cs.washington.edu/education/ugradscholars/scholarships.html.
- * **Student Organizations/Associations:** A student chapter of the Association for Computing Machinery (ACM) operates within CSE. The ACM helps to coordinate new student orientations, research nights, technical talks, and various tutorials.

Graduate Program

Graduate Program Coordinator
AC101 Paul G. Allen Center for Computer Science and Engineering, Box 352350
206-543-1695
grad-admissions@cs.washington.edu

The Department of Computer Science and Engineering offers programs of study leading to the degrees of Master of Science and Doctor of Philosophy. Students can pursue full-time graduate study leading to a Ph.D. with an integrated M.S. Students can also pursue part-time graduate study in the evening, leading to an M.S. Programs are designed to provide considerable breadth of knowledge, as well as depth in an area of specialization.

The department has 40 faculty and is authorized to grow over the next few years. In addition, there are nearly 40 adjunct, affiliate and emeritus faculty members. The faculty is currently conducting research in the following areas: embedded systems and reconfigurable computing; computer architecture; networking; operating systems and distributed systems; programming systems; information retrieval, database systems, and intelligent Internet systems; software engineering; computer graphics, vision, and animation; human interface to computing; artificial intelligence; theory of computation; and computing and biology.

Master of Science

Degree Requirements

40 credits, as follows:

Non-Thesis Option:

- * Of the 40 credits required, 20 credits must be in courses numbered 500 or above, 30 credits must be in CSE courses, and 10 credits may be in one or more supporting fields.
- * Satisfactorily passing an M.S. Qualifying Evaluation. The faculty as a whole assesses whether the student has satisfactorily completed a breadth requirement and an independent project requirement as described below.
- * A breadth requirement must be satisfied through coursework. The required course list may change from time to time to reflect changes in the curriculum and faculty research interests. Students may choose to meet the requirements in place when they were admitted. Students are required to take the following six courses (18 credits) for graded credit (a waiver is possible for graduate courses taken elsewhere):
 - o Either CSE 521 (3) or CSE 531 (3)
 - o Either CSE 548 (3), CSE 551 (3), CSE 561 (3), or CSE 567 (3)
 - o Either CSE 501 (3), CSE 503 (3), or CSE 505 (3)
 - o Either CSE 510 (3), CSE 544 (3), CSE 546 (3), CSE 557 (3), CSE 573 (3), or CSE 576 (3)
 - o Two additional courses from two of the groups above
- * An independent project must be completed under the supervision of a primary and a secondary faculty advisor. A written summary and an oral presentation are required.

Thesis option:

- * 9 credits CSE 700, Master's Thesis
- * Of the 31 remaining credits,
 - o At least 16 credits must be in courses numbered 500 or above
 - o 24 credits must be CSE courses
 - o 7 credits may be in one or more supporting fields such as: engineering, mathematics, natural sciences, business administration, linguistics, philosophy, psychology, or medicine.
- * Thesis: Preparation of a written thesis acceptable to a CSE Supervisory Committee and satisfactorily passing an oral examination on the thesis work.

Professional Masters Program

Degree Requirements

To satisfy the requirements of the Professional Master's Program, students must successfully complete eight 4-credit PMP courses (determined in consultation with an adviser) and other courses providing 8 additional credits. The additional credits may be earned through participation in the department's colloquium series, which features leading-edge researchers and developers in computer science from around the world. This series airs throughout the Puget Sound region on UWTV and is available live and

archived on the Internet. Students who take one course per quarter, plus 1 credit of colloquium, complete the program in two-and-a-half years.

Doctor of Philosophy

90 credits, as follows:

- * Satisfactorily passing a Ph.D. Qualifying Evaluation. The faculty as a whole assesses whether the student has satisfactorily completed a breadth requirement and an independent project requirement as described below.
 - o A breadth requirement will be satisfied through coursework. The required course list may change from time to time to reflect changes in the curriculum and faculty research interests. Students may choose to meet the requirements in place when they were admitted. Students are required to take the following eight courses (24 credits) for graded credit (a waiver is possible for graduate courses taken elsewhere):
 - + Either CSE 521 (3) or CSE 531 (3)
 - + Either CSE 548 (3), CSE 551 (3), CSE 561 (3), or CSE 567 (3)
 - + Either CSE 501 (3), CSE 503 (3), or CSE 505 (3)
 - + Either CSE 510 (3), CSE 544 (3), CSE 546 (3), CSE 557 (3), CSE 573 (3), or CSE 576 (3)
 - + Two additional courses from two of the groups above
 - + No more than three courses from any one of the groups above.
 - o An independent project must be completed under the supervision of two faculty advisers. A written summary and an oral presentation are required.
- * Satisfactorily passing the General Examination. In this examination, the applicant must demonstrate depth of knowledge in a principal area acceptable to the Ph.D. Supervisory Committee.
- * Completion of at least 90 credits of course work, at least 40 of which are to be in courses numbered 500 or above. 45 credits should be in courses chosen from the Computer Science course list. At least two CSE courses numbered 500 or above (or approved courses in related disciplines) must be taken for graded credit in addition to those courses taken to satisfy the breadth component of the qualifying evaluation. Coursework taken toward the M.S. degree is applicable toward the Ph.D. degree.
- * Completion of two quarters of teaching assistantship within the department.
- * Preparation of a dissertation that must be acceptable to the Supervisory Committee. Students must register for at least 27 credits of CSE 800 (Dissertation).
- * Satisfactorily passing an oral examination on the dissertation work.

Application Requirements

Most entering graduate students are expected to have a solid background in computer science, including programming, machine organization, data structures, discrete mathematics, automata theory, and programming systems (i.e., the equivalent of CSE 378, 326, 321, 322, and either 401 or 451). Some exceptions to these requirements are made for otherwise-promising students. Graduate Record Examination scores are required; a GRE subject-test score (not necessarily in computer science) is recommended. Scores should be earned within the preceding five years. The Computer Science and Engineering Graduate Program Brochure gives full details of application procedures.

Complete applications must be received by December 15 for both U.S. and international students for autumn-quarter admission.

Assistantships

Research and teaching assistantships are available and are allocated on the basis of scholastic excellence and potential. All students accepted to the program are awarded three years of funding. Students who are applying for assistantships to start in autumn quarter should have all applications to the Graduate School and the department completed by December 15.

The application packet contains all the necessary forms for applying to the Graduate School and to the graduate program in Computer Science and Engineering and for consideration for assistantships.

Course Descriptions

See page 502.

Electrical Engineering

AE100R Paul Allen Center

Electrical engineering is concerned with the understanding and utilization of electricity and with providing society useful, efficient, and economic products and services. It encompasses everything from batteries and power supplies to crystal fabrication, autonomous robots, and devices that can recognize human speech. Electrical engineers design, produce, study, and operate all manner of devices and systems that use electric and electromagnetic energy. They also work on systems at the macro scale of electric power grids and at the micro scale of nanotechnology.

Contemporary society is in the midst of an information revolution, created in large part from the fruits of electrical engineering. Rapid improvements in communication technologies, computer visualization, and information access continue to have a significant impact on manufacturing, medicine, transportation, and environmental monitoring. Dramatic advances in personal communication services, digital imaging, and network hardware and software are changing the texture of everyday life for an increasing portion of the world's population.

Undergraduate Program

Adviser
AE 100R Paul Allen Center 206-543-2142
undergrad@ee.washington.edu

The Department of Electrical Engineering offers the following program of study

- * The Bachelor of Science in Electrical Engineering degree

Bachelor of Science in Electrical Engineering

Suggested First- and Second-Year Courses: MATH 124, MATH 125, MATH 126; CHEM 142; English composition; PHYS 121 (and beyond if possible). Students should start in math courses right away and follow with physics, chemistry, computer programming, etc. as soon as possible. The department publishes a sample four-year plan of study for fulfilling all degree requirements, including those to be taken during the first year, online at www.engr.washington.edu/score/EEPlan.pdf.

Department Admission Requirements

Because resources are limited, students must apply for admission to the electrical engineering program. Application forms and a comprehensive booklet, *The Electrical Engineering Handbook for Undergraduates*, can be obtained from the undergraduate adviser for electrical engineering. The department classifies applicants by admission group; the specific requirements for each are described below. Admission to the department is competitive and completion of the requirements does not guarantee admission. All applicants have the right to petition and appeal the admissions decision of the department. Please see the undergraduate adviser for more information.

Applicants are considered in three groups -- Early Decision, Early Admission, and Upper-Division Admission. Admission is competitive. Completion of minimum requirements does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision.

Early Decision

The Department of Electrical Engineering enrolls up to 10 percent of its incoming class directly out of high school, prior to the completion of University-level prerequisites. Freshman applicants to the University of Washington who list Electrical Engineering as their intended major are automatically considered. Competitive applicants will have taken or be taking calculus and at least one year of laboratory science (preferably physics). Admission is for autumn quarter only.

Early Admission

1. Course requirements: MATH 124, MATH 125, MATH 126; 10 credits of physical science plus accompanying laboratory at the level of PHYS 121, PHYS 122, PHYS 123, or CHEM 142, CHEM 152, or equivalent; 5 credits of English composition. All courses must be completed prior to the July 1 application deadline.

- Applicants must be currently enrolled at the UW and must have completed a minimum of 16 credits taken in residence at the UW. Early Admission is available autumn quarter only. Application deadline is July 1.
- Grade requirements: Minimum 2.50 GPA in courses required for admission, and minimum 2.50 overall GPA.

Upper-Division Admission

- Course requirements: MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122; CHEM 142; 5 credits of English composition.
- 64 credits completed by application deadline (July 1 for autumn admission; February 1 for spring admission).
- Grade requirements: Minimum overall 2.50 GPA and minimum 2.50 GPA in courses required for admission.

Graduation Requirements

General Education Requirements (81 credits)

- Written and Oral Communications: 12 credits, to include one 5-credit English composition course from the University list; T C 231; T C 333 (or department-approved alternative).
- Visual, Literary, and Performing Arts (VLP), and Individuals & Societies (I&S) (25 credits): A minimum of 10 credits is required in each area.
- Natural World (44 credits):
 - Mathematics (24 credits): MATH 124, MATH 125, MATH 126, MATH 307 (or AMATH 351), MATH 308 (or AMATH 352), and MATH 324.
 - Science (20 credits): CHEM 142; PHYS 121, PHYS 122, PHYS 123

Major Requirements (80-81 credits)

- Computer Programming (9 credits): CSE 142, CSE 143
- Electrical Engineering Core (13 credits): E E 215, E E 233, E E 235
- Electrical Engineering Electives (45 credits): See adviser for list of acceptable courses.
- Engineering Electives (10 credits): See adviser for list of acceptable courses.
- Statistics (3-4 credits): STAT/MATH 390 or IND E 315
- Grade Requirements: Minimum 2.00 GPA in all E E courses with no grade below 1.0 in any of these courses.

Electives (18-19 credits)

- Approved Non-Electrical Engineering Electives (10 credits): Selected from courses listed in the departmental handbook.
- Free Electives (8-9 credits)

Student Outcomes and Opportunities

- Learning Objectives and Expected Outcomes:* Graduates with a degree in electrical engineering find employment in industries such as aerospace, communications, computer manufacturing, power distribution, consumer electronics, and biomedical engineering. Positions can be found focusing on the research, design, and testing of new products; in technical sales and marketing; business consulting; and even growing areas such as intellectual property. Students who pursue graduate studies are quite successful in highly competitive national and international programs.

The BSEE program is accredited by the Accrediting Board for Engineering and Technology (ABET) and the department has adopted the following student outcomes:

- ability to apply knowledge of mathematics, science, and engineering
- ability to apply knowledge of probability and statistics, including applications appropriate to the program name and objectives
- ability to apply knowledge of mathematics through differential and integral calculus, basic science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components
- ability to apply knowledge of advanced mathematics, typically involving differential equations, linear algebra, complex variables, and discrete mathematics
- ability to design and conduct experiments, as well as to analyze and interpret data
- ability to design a system, component, or process to meet desired needs
- ability to function on multi-disciplinary teams
- ability to identify, formulate, and solve engineering problems

- understanding of professional and ethical responsibility
- ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global and societal context
- recognition of the need for, and an ability to engage in, life-long learning
- knowledge of contemporary issues
- ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

- Instructional and Research Facilities:* The department maintains a number of instructional and research labs to support courses and independent study activities. There are three general-purpose computing labs. Instructional labs include a large instrumentation lab supporting numerous electronics courses; individual labs for digital design courses; a power lab to support the power/energy systems classes; and labs that support capstone design classes. Students participating in undergraduate research and independent study generally have access to the research labs of their supervising faculty member.

- Honors Options Available:* With College Honors. With Distinction. See adviser for details.

- Research, Internships, and Service Learning:* Many electrical engineering students participate every year in internship and co-op (cooperative education) programs. The Engineering Co-op Office is one source for companies recruiting for internship and co-op students. The Center for Career Services also lists a variety of internship opportunities.

- Department Scholarships:* Many scholarships specifically for electrical engineering majors and based on merit and financial need are awarded each year. Students interested in applying for these and other College of Engineering scholarships may obtain information from the Department of Electrical Engineering Scholarship Award Committee Chair.

- Student Organizations/Associations:* The Institute of Electrical and Electronics Engineers (IEEE), UW student chapter organizes social activities, workshops, field trips and other professional development opportunities. Eta Kappa Nu (HKN) is an invitation-only honor society for electrical engineering students. HKN organizes tutoring services, tutorial workshops, social activities, and community services projects.

Of Special Note: The departmental policy on continuation is consistent with the continuation policy of the College but also includes supplementary requirements specific to the department. Details may be obtained from the department advising office.

Graduate Program

Graduate Program Coordinator
 AE100R Paul Allen Center, Box 352500
 206-543-2142
 grad@ee.washington.edu

The Department of Electrical Engineering offers graduate programs leading to the degrees of Master of Science in Electrical Engineering (M.S.E.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in biosystems, circuits and network theory, computational intelligence, computer networks and distributed systems, computer architecture, digital systems, software engineering, operating systems, microprocessors, VLSI design, control systems, electromagnetics (including optics and radio science), electronic materials (including devices and micro-electronics), energy systems (including power electronics and electric drives), signal and image processing, telecommunications, and virtual reality. Numerous interdisciplinary research opportunities exist, including projects relating to bioengineering, computer engineering, and marine acoustics. The department does extensive research in coordination with the University of Washington's Applied Physics Laboratory and Washington Technology Center.

The M.S.E.E. degree may be earned in three ways, each of which requires the accumulation of 45 credits. A student may perform research and write a thesis; a student may pursue a one-quarter project as part of their studies; or a student may simply accumulate a suitable distribution of 45 credits of course work. Course work for each of the options is developed with the advice of faculty advisers as well as through the department advising staff.

For the Ph.D. degree, students must pass the departmental qualifying examination, pass an advanced General Examination, pursue an original research problem, and report the results of that research in a dissertation

that must be a contribution to knowledge. At least one year of course work beyond the M.S.E.E. degree is usually desirable.

Master of Science in Electrical Engineering

Admissions Requirements

In addition to meeting Graduate School admission requirements, the Graduate Record Examination (GRE) general test is required of all students. Official test scores must be submitted, along with a formal application, a statement of purpose, and a minimum of two reference letters.

Although most applicants have baccalaureate degrees in electrical engineering, applicants with degrees in other branches of engineering, the physical sciences, computer science, or mathematics often are able to pursue graduate study in electrical engineering following some additional preparation. Such applicants are strongly encouraged to contact the department for further information.

For more information on admissions qualifications, visit the department's Web site at www.ee.washington.edu/graduate/admitcriteria.html.

Degree Requirements

Masters students have the option of choosing between three different pathways for pursuing their degree:

- * *Thesis option:* The thesis option is best intended for students who wish to pursue an in-depth research experience with intended preparation for pursuing a Ph.D.
- * *Project option:* Students who wish to combine the written work of a thesis with a more hands-on approach to individual problems may choose the project option.
- * *Coursework option:* A student whose main goal is to work in industry immediately upon graduation may find the coursework option more suitable to their needs.

These three options have several related requirements:

- * Students must complete a plan of study by their second quarter of study.
- * Students must complete a minimum of 45 credits.
- * Students must be registered full time (10 credits) per quarter (less in summer)
- * Students may apply no more than 3 credits of E E 500. 1 credit is required.
- * Students may apply no more than 5 credits of E E 599 to the degree.
- * Students are required to take 1 credit of E E 592, offered autumn quarter.

Thesis Option

45 credits, as follows:

- * 9-12 credits of E E 700
- * At least 20 credits in E E courses numbered 500 and above
- * No more than 12 credits in E E 400-level courses
- * No more than 9 credits from non-E E courses

The thesis option is an opportunity to pursue an individual problem in depth and in close collaboration with a faculty member. Typical problems involve basic research or application of classroom principles to a professional problem beyond the routine practice of electrical engineering. Students who choose the thesis option must complete a written thesis and oral examination based upon the thesis material before their degree is granted.

Project Option

45 credits, as follows:

- * A minimum of 4 credits E E 600
- * At least 25 credits in E E courses numbered 500 and above
- * No more than 12 credits in E E 400-level courses
- * No more than 9 credits from non-E E courses

The required 4 credits of E E 600 must be completed in one quarter and receive a minimum grade of 3.0. Students must complete a written report and an oral presentation to faculty. A student's supervisory committee may permit the student to conduct a second project, allowing a total of 8 credits of E E 600 credits. However, students may not continue project work from one quarter to another.

Coursework Option

45 credits, as follows:

- * At least 25 credits in E E courses numbered 500 and above
- * No more than 12 credits in E E 400-level courses
- * No more than 9 credits from non-E E courses

The coursework option allows students to pursue the M.S.E.E. by taking a prearranged course load specific to each of the seven curriculum areas. A generic coursework option is also available. The curriculum group chair and the Graduate Program Coordinator must approve deviation from these prearranged plans.

Doctor of Philosophy

Admissions Requirements

In addition to meeting Graduate School admission requirements, the Graduate Record Examination (GRE) general test is required of all students. Official test scores must be submitted, along with a formal application, a statement of purpose, and a minimum of two reference letters.

Although most applicants have baccalaureate degrees in electrical engineering, applicants with degrees in other branches of engineering, the physical sciences, computer science, or mathematics often are able to pursue graduate study in electrical engineering following some additional preparation. Such applicants are strongly encouraged to contact the department for further information.

For more information on admissions qualifications, visit the department's Web site at www.ee.washington.edu/graduate/admitcriteria.html.

Degree Requirements

The Ph.D. is awarded based on general proficiency and distinctive attainments in Electrical Engineering, particularly on the demonstrated ability of independent investigation. As evidence of ability, the student must produce a doctoral dissertation embodying original research yielding a new contribution to knowledge and presented with a satisfactory degree of literary skill. The majority of Ph.D. students hold master's degrees within the same field, although students with degrees in the physical sciences and other engineering fields are also admitted. To earn a Ph.D., students must:

- * Pass the department Qualifying Examination
- * Complete an individualized course of study approved by the student's Ph.D. Supervisory Committee
- * Pass the University General Examination
- * Prepare and defend a satisfactory dissertation based on original research
- * Complete at least 90 credits of course work, independent study, and dissertation (60 of which must be completed at the UW), 18 of which must be graded credits
- * Maintain a cumulative minimum GPA of 3.00.
- * Complete 30 credits of dissertation credits (E E 800)

Research Groups

Facilities in the Department of Electrical Engineering include research laboratories for advanced digital systems, advanced power technology, applied electromagnetics, optics, remote sensing, applied signal and image processing, mechatronics and intelligent control, modern sensors, and semiconductor technology

Financial Aid

Research assistantships, teaching assistantships, scholarships, and graduate fellowships are available to qualified graduate students in all areas of electrical engineering. Most awards include a monthly stipend plus payment of tuition and fees.

Course Descriptions

See page 506.

Industrial Engineering

G-7 Mechanical Engineering Building

Industrial engineering (IE) prepares students for careers in an increasingly diverse, dynamic and technological world. Industrial engineers focus on the integration of humans, machines, materials and information to achieve optimum performance of operating systems. This focus on the "big picture" makes industrial engineering one of the most people-oriented and customer-focused of the engineering disciplines.

Industrial engineering involves the study of engineering design, system integration, optimization, quality and reliability, supply chain management, virtual reality, and manufacturing.

Other engineering disciplines apply skills to very specific areas. Industrial engineers have the opportunity to work in many different kinds of businesses and nonprofit organizations. The most distinctive aspect of industrial engineering is the flexibility it offers. Many industrial engineers eventually move into supervisory or management positions where they continue to draw on their technical background. Demand for industrial engineers has grown dramatically over the past two decades.

Undergraduate Program

Adviser

G7 Mechanical Engineering, Box 352650
206-543-5041
leadvise@u.washington.edu

The Industrial Engineering program offers the following program of study:

- * The Bachelor of Science in Industrial Engineering degree

Bachelor of Science in Industrial Engineering

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126; CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123; English composition; courses to fulfill VLPA and I&S requirements.

Department Admission Requirements

Applicants are considered in three groups -- Early Decision, Early Admission, and Upper-Division Admission. Admission is competitive. Completion of minimum requirements does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision.

Early Decision

The UW Industrial Engineering program enrolls up to 10 percent of its incoming class directly out of high school, prior to the completion of university-level prerequisites. Freshman applicants to the University of Washington who have listed Industrial Engineering as their intended major will be automatically considered. Competitive applicants will have taken or be taking calculus and at least one year of laboratory science (preferably physics). Admission is for autumn quarter only.

Early Admission

1. Course requirements: MATH 124, MATH 125, MATH 126; 10 credits of physical-science courses plus accompanying laboratory, at the level of PHYS 121, PHYS 122, PHYS 123, or CHEM 142, CHEM 152; and 5 credits of English composition. All courses must be completed prior to the July 1 application deadline. Admission is for autumn quarter only.
2. Applicants must be currently enrolled at the UW and must have completed a minimum of 15 credits taken in residence at the UW.
3. Grade requirements: Minimum grade of 2.0 in each prerequisite course and a minimum overall GPA of 2.50.

Upper-Division Admission

1. Course requirements: MATH 124, MATH 125, MATH 126.; PHYS 121, PHYS 122, PHYS 123; CHEM 142, CHEM 152; and at least 5 credits of English composition.
2. 45 credits completed by application deadline, which is July 1 for autumn admission and February 1 for spring admission.

Graduation Requirements

180 credits as follows:

General Education Requirements (91 credits)

1. Written and Oral Communications (12 credits): 5-credits in English composition from the University-approved list; T C 231; T C 333 (or department-approved alternative).
2. Visual, Literary, and Performing Arts (VLPA) and Individuals and Societies (I&S) (30 credits): A minimum of 10 credits is required in each area.
3. Natural World (49 credits)
 - a. Mathematics (24 credits): MATH 124, MATH 125, MATH 126, MATH 307, MATH 308; IND E 315
 - b. Science (25 credits): CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123

Major Requirements (89 credits)

1. Engineering Fundamentals (28 credits): CSE 142, MSE 170, A A 210, E E 215, CEE 220, M E 230, IND E 250
2. Industrial Engineering Core (24 credits): IND E 310, IND E 311, IND E 316, IND E 337, IND E 494, IND E 495
3. Technical Electives (37 credits): At least one class from approved courses in each of the following areas: operations research, statistics, production/operations, design, and general engineering. See adviser for list of approved technical electives.
4. Grade Requirements: Minimum 2.00 GPA in all engineering courses with no grade below 1.0 in these courses.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Industrial engineering graduates are proficient in mathematics, sciences, engineering fundamentals, and the use of computers; use a broad knowledge of industrial engineering methods and tools associated with operations research, quality engineering, and human factors; apply engineering design methods and tools to represent, integrate and solve problems, including the ability to recognize problem context and integrate knowledge and skills from allied disciplines; communicate effectively; and possess the professional characteristics of leadership, ethics, and the ability to motivate and work with others.

IE prepares students to serve as the efficiency experts of organizational change. Students are encouraged to take a systems view when solving problems, recognize the organizational and societal impact of technical decisions, develop good oral and written communication skills, participate in teams, and take initiative. Industrial engineers draw upon specialized knowledge and skills in math, the physical sciences, and social sciences together with the principles and methods of engineering analysis and design.

- * *Instructional and Research Facilities:* Industrial Engineering provides designated computing facilities for undergraduate students. Research facilities include the Human Interface Technology Laboratory, the Production Systems Laboratory, the Manufacturing Laboratory, and The Center for Engineering Learning and Teaching.
- * *Honors Options Available:* With College Honors. With Distinction (Departmental Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Students have the opportunity to pursue cooperative and internship programs at the College level through the College's Engineering Co-op Program (www.engr.washington.edu/coop/).
- * *Department Scholarships:* IE offers scholarships to outstanding undergraduate students. All applicants to the BSIE program are considered for these scholarships. Awards are made based on both merit and financial need.
- * *Student Organizations/Associations:* Students are actively involved in the UW student chapter of the Institute of Industrial Engineers (IIE); the IE National Honor Society, Alpha Pi Mu; and the IE Student Advisory Board.

Graduate Program

Graduate Program Coordinator
G7 Mechanical Engineering, Box 352650
206-543-5041
ieadvise@u.washington.edu

Industrial Engineering offers graduate programs leading to the Master of Science in Industrial Engineering (M.S.I.E.) and Doctor of Philosophy (Ph.D.). Graduate courses and research programs are offered in manufacturing, operations research, large-scale assembly, experimental statistics, production planning, quality control, reliability engineering, computer-integrated manufacturing, simulation, supply chain, human factors, virtual reality, and human interface technology.

Master of Science in Industrial Engineering

Admission Requirements

To be eligible for consideration to the M.S.I.E. degree, applicants are expected to have a bachelor's degree in engineering, mathematics, or science, with a minimum GPA of 3.00.

Degree Requirements

41 credits, as follows:

- * Coursework Only Program:
 - o 21 graded course credits in industrial engineering (500 level or above) courses
 - o 17 graded course credits in technical electives (a maximum of 9 technical elective credits may be taken at the 400 level)
 - o 3 credits of Industrial Engineering seminar: IND E 591, IND E 592, IND E 593 (1, 1, 1)
- * Thesis Program:
 - o 18 graded course credits in industrial engineering (500 level or above) courses
 - o 11 graded course credits in technical electives (a maximum of 9 technical elective credits may be taken at the 400 level)
 - o 9 credits of master's thesis (IND E 700)
 - o 3 credits of Industrial Engineering seminar: IND E 591, IND E 592, IND E 593 (1, 1, 1)

Doctor of Philosophy

Admission Requirements

To be eligible for consideration to the Ph.D. in Industrial Engineering degree, applicants should have, or be close to completing, their Master's degree in any discipline of engineering when applying, with a minimum GPA of 3.00.

Degree Requirements

90 credits, as follows:

- * 3 credits of Industrial Engineering graduate seminar: IND E 591, IND E 592, IND E 593 (1, 1, 1)
- * 60 credits of coursework, with at least 18 credit hours of 500-level courses. A master's degree from the UW or another institution may be used as a substitute for 30 of these 60 credits.
- * General examination
- * Dissertation: 27 credits of dissertation (IND E 800) over a period of at least three quarters.
- * Final examination

Course Descriptions

See page 511.

Materials Science and Engineering

302 Roberts

Materials science and engineering is an interdisciplinary field that addresses the structure, processing, and property relationships in materials for engineering applications. Basic principles of chemistry and physics are applied to provide an understanding of the structure of materials and the manner in which the structure determines the properties. Scientific processing methods are then applied to yield the necessary properties, which then can be integrated with, and designed to accommodate the needs of, modern technology.

Advances in materials enable technological progress in many fields. Historically, this connection between materials and technology has been so intimate that major periods in civilization have been named after the dominant material used in that era (e.g., Bronze Age, Iron Age). In the past few decades, at the core of the progress in such diverse fields as transportation, communication, electronics, energy and environment are significant advances in materials. Materials science and engineering is a broad and growing discipline.

Materials Science and Engineering at the University of Washington has recently experienced rapid expansion into new research areas, including polymers, hybrids, biomaterials, biomimetics, nanomaterials, photonic and magnetic materials. These areas have applications in current and emerging industries, and complement existing strength in ceramics, metals, electronic materials, and composites.

Undergraduate Program

Adviser
302A Roberts, Box 352120
206-543-2600
mse@u.washington.edu

The Department of Materials Science and Engineering offers the following programs of study:

- * The Bachelor of Science in Materials Science and Engineering degree
- * A minor in materials science and engineering

Bachelor of Science in Materials Science and Engineering

Suggested First- and Second-Year College Courses: MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122, PHYS 123; CHEM 142, CHEM 152; English composition; CSE 142; MSE 170; AA 210; CEE 220; T C 231.

Department Admission Requirements

Applicants are considered in two groups -- Early Admission and Upper-Division Admission. Admission is competitive. Completion of minimum requirements described below does not guarantee admission. All applicants have the right to appeal the department's admission decision. Application information is available from the department adviser.

Early Admission

1. Course requirements: MATH 124, MATH 125, MATH 126; 10 credits of physical science at the level of PHYS 121, PHYS 122, PHYS 123, or CHEM 142, CHEM 152, or above; 5 credits of English composition. All courses must be completed prior to the July 1 application deadline. (T C 231 and M E 123 must be taken no later than the academic year of admission.)
2. Applicants must be currently enrolled at the UW and must have completed a minimum of 15 credits taken in residence at the UW. Applications are accepted for autumn quarter only. Application deadline is July 1.
3. Grade requirements: Minimum 2.0 grade in each course required for admission and minimum 2.50 cumulative GPA for all courses required for admission.

Upper-Division Admission

1. Course requirements: MATH 124, MATH 125, MATH 126, MATH 307; PHYS 121, PHYS 122; CHEM 142, CHEM 152; CSE 142; MSE 170; 5 credits of English composition.

- 64 credits completed by application deadline. Applications are accepted for autumn quarter (July 1 deadline) and spring quarter (February 1 deadline).
- Grade requirements: Minimum 2.0 grade in each course required for admission and minimum 2.50 cumulative GPA for all courses required for admission.

Graduation Requirements

180 credits as follows:

General Education Requirements (85 credits)

- Written and Oral Communications: 12 credits, to include one 5-credit English composition course from the University list; T C 231; T C 333 (or department-approved alternative).
- Visual, Literary, and Performing Arts (VLPA), and Individuals & Societies (I&S) (24 credits): A minimum of 10 credits is required in each area.
- Natural World (55-60 credits):
 - Mathematics (24-25 credits): MATH 124, MATH 125, MATH 126, MATH 307, MATH 308 (or MATH 318); one from MATH 309, MATH 324, IND E 315, or STAT 390
 - Science (31-35 credits): CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123; two of the following: PHYS 224, PHYS 225, CHEM 162, CHEM 223, CHEM 224, CHEM 237, CHEM 238, CHEM 455, CHEM 457

Major Requirements (89-90 credits)

- Engineering Fundamentals (24 credits): CSE 142, MSE 170, A A 210, CEE 220; two of the following: E E 215, M E 123, CHEM E 260, IND E 250.
- Materials Science and Engineering Core (49-50 credits): 310, MSE 311, MSE 312, MSE 313, MSE 321, MSE 322, MSE 331, MSE 333, MSE 342, MSE 351, MSE 352, MSE 362, MSE 431, MSE 442, MSE 491, MSE 492, MSE 499
- Technical Electives (16 credits): See department advising office for list of acceptable courses.
- Grade Requirement: Minimum 2.00 departmental cumulative GPA.

Minor

Minor Requirements: 30 credits as follows: MSE 170, MSE 321, MSE 322, MSE 331, MSE 333, MSE 342, MSE 351, MSE 352, MSE 362. A minimum grade of 2.0 is required for each course.

The following courses serve as prerequisites for the departmental courses in the minor: MATH 124, MATH 125, MATH 126, MATH 307, and MATH 308 or MATH 318; CHEM 142 or CHEM 145, CHEM 152 or CHEM 155; PHYS 121, PHYS 122, PHYS 123; MSE 170; English composition. Students should take these courses before beginning the minor program.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Undergraduate students are offered both broad core and in-depth courses. The broad core provides the needed background and understanding of all types of engineering materials, including metals, ceramics, polymers, electronic materials, and composites. The curriculum provides an opportunity to use basic knowledge in science and engineering fundamentals to synthesize and design materials for engineering applications. The undergraduate curriculum emphasizes hands on experience, oral and written communication, and team-work, and encourages participation in research. Graduates with a degree in materials science and engineering find employment in a broad range of industries including aerospace, biomedical, electronic manufacturing, materials processing, and transportation.

The degree program in materials science and engineering has the following outcomes for graduates:

- Provides that graduates have fundamental knowledge of mathematics and science, and are able to apply them to engineering problems and to a variety of materials systems
- Develops graduates who are skilled in engineering fundamentals
- Ensures that graduates are knowledgeable about all classes of materials and their properties, structure, processing and applications
- Provides specific knowledge related to structure, properties, processing, and performance specific to materials science and engineering
- Applies advanced science (such as chemistry and physics) and

- engineering principles to engineering systems
- Describes and applies the scientific and engineering principles underlying the four major elements of the field: structure, properties, processing, and performance related to material systems
- Solves materials selection and design problems by integrating knowledge from each of the four elements of the field
- Utilizes experimental, statistical, and computational methods for analysis and design problems
- Uses hands-on laboratory experience to solve real engineering problems
- Has the needed background for effective practice in industry and government
- Has a sound, well-balanced education that prepares them to understand their professional responsibilities and the basis for a thoughtful and responsible life
- Has experience in integrating engineering and materials design concepts with societal issues, including economics, ethics, quality, and human values
- Is prepared to enter graduate programs, as appropriate to the student and the area of interest
- Has the ability to communicate effectively, orally and in writing, the concepts and results of engineering investigations to both technical and non-technical audiences

* *Instructional and Research Facilities:* Facilities include equipment for electron and optical microscopy, x-ray diffraction, high-temperature heat treatment and mechanical testing, specialized processing equipment, including hot and cold isostatic presses, nitrogen reaction furnaces, and automated TGA, DTA analysis systems. Equipment for analyses of particle size, surface areas, and pore size is also available. Students have liberal access to University computing facilities.

* *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

* *Research, Internships, and Service Learning:* Materials Science and Engineering students interested in paid internship experiences should contact the Engineering Co-op Program, 301 Loew Hall, Box 352180, 206-543-8711, coop@enr.washington.edu.

* *Department Scholarships:* In addition to need-based aid provided through the University's Office of Student Financial Aid, companies and individuals with interest in developing materials science and engineering students have provided scholarships for students admitted to the program. Specific information and application forms are available from the academic counselor in 302 Roberts.

* *Student Organizations/Associations:* Keramos (materials honor society); American Ceramic Society (ACerS); ASM/TMS (the joint student chapter of ASM International and TMS); Society for the Advancement of Materials and Process Engineering (SAMPE).

Of Special Note:

Combined B.S./M.S. Degree Program

The goal of the combined B.S./M.S. program in Materials Science and Engineering is to provide a more direct route to the master's degree for well-qualified undergraduate students who wish for more in-depth graduate-level work in preparation for work in industry or for a Ph.D. program. It creates a more efficient and continuous academic program that leads directly to the Master of Science degree. Students earn both the B.S. and M.S. degrees in five years. This program is available to students after they are admitted to the department. Information is available below.

Graduate Program

Graduate Program Coordinator
302 Roberts, Box 352120
206-543-2600
mse@u.washington.edu

The Department of Materials Science and Engineering offers programs of study leading to the Master of Science in Materials Science and Engineering (M.S.M.S.E.) and the Doctor of Philosophy in either Materials Science and Engineering and Materials Science and Engineering/Nanotechnology.

In addition, the degree of Master of Science (without designation) is offered through the College of Engineering. This degree is intended to accommodate students with undergraduate majors outside physical science or

engineering who desire a special graduate program to encompass a broad range of materials science studies.

The primary goals of the master's and doctoral programs are to prepare students for industrial employment and research/development careers and to generate new knowledge. The specific objectives are:

- * Deepen knowledge and capabilities broadly and in a chosen specialty area: A student's knowledge, attained through coursework and scholarly investigation of literature relevant to thesis project, should be commensurate with leading researchers in the field.
- * Master and develop state-of-the-art research techniques appropriate to specialty: Analytical, computational, and experimental tools are learned via instruction by advisor(s) and peers in conjunction with maintaining currency with literature.
- * Contribute new knowledge of lasting value to the field by creative and independent research: A student's thesis research must demonstrate originality and high quality, as judged by faculty committee
- * Broaden candidate's knowledge of field and societal issues: Through coursework, department and group seminars, and attendance at professional meetings, a student learns to appreciate context of specialty within materials science and engineering and gain ability to apply knowledge and methods to a spectrum of engineering and scientific challenges.
- * Learn to work effectively with colleagues and contribute to professional community: Attained by cooperation in team research projects, presentation of research and professional meetings.

Combined Bachelor of Science/Master of Science

Admission Requirements

Students may apply to enter the combined BS/MS program any time after they are accepted into the MSE department as an undergraduate major. Requirements for application include:

- * Overall minimum GPA of 3.20 in the last 90 credits before application.
- * At least 15 credits of MSE courses completed with a minimum GPA of 3.40.
- * Statement of interest and goals for the M.S. degree.
- * Interview with admissions committee

Students accepted into the combined BS/MS program by the department will then apply to the Graduate School in December of their senior year. These students will normally enroll in the Materials Science option for the M.S. degree.

Degree Requirements

216 credits.

Requirements are the same as for the current BS and MS programs. However, up to 7 credits of 400- or 500-level courses taken as an undergraduate over and above the BS requirement may be counted towards the MS degree. These credits would be transferred to the graduate program when the student enters as a graduate student, subject to the approval of the MSE Graduate Program Committee. The graduate school will waive the restrictions on transfer credits for this purpose.

Students admitted into the BS/MS program will combine their BS senior project requirement (MSE 499) with the MS thesis requirement (MSE 700) and will begin the research starting summer or autumn quarter of their senior year. The student will receive 4 credits of MSE 499 for the undergraduate portion of the research program, and then register for 9 or more credits of MSE 700 for the thesis. Written and oral reports are required to complete the 499 credits, to be submitted before the end of the senior year. The thesis is required for the completion of the MS degree.

Master of Science in Materials Science and Engineering

Admission Requirements

The applicant must have a minimum undergraduate grade point average of 3.00 in the last 90 graded quarter hours or the last 60 graded semester hours. Graduate Record Examination (GRE) results are also required for the general test.

Students with backgrounds in engineering and the physical sciences are admitted into the M.S.M.S.E. program. After admission, students with a minimum of three years' industrial experience in an engineering position may apply for the Engineering Materials (practice-oriented, non-thesis) option.

Specific program pre-requisites, which may be satisfied after entry into the program, are:

- * Knowledge of fundamentals of Materials Science and Engineering equivalent to MSE 170
- * Knowledge of crystallography equivalent to MSE 331
- * Background in materials properties equivalent to MSE 362 and MSE 351
- * Knowledge of kinetics equivalent to MSE 322
- * Understanding of thermodynamics equivalent to the level of MSE 421

Degree Requirements

36 credits, as follows:

At least 27 credits must be for course work, including 3 credits of MSE 520 seminar (see below). Of these 27 credits, 18 must be in courses numbered in the 500 series (these 18 may include the 3 seminar credits). Numerical grades from approved 400 level and all 500 level courses must be received for at least 18 quarter credits of course work taken at the University of Washington. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University. Required courses may not be taken on a S/NS option. The S/NS option in other courses must have the approval of the student's faculty advisor.

Thesis Option

- * Three required core courses (9 credits): MSE 510 (3), MSE 525 (3), MSE 541 (3)
- * Three optional core courses
- * 3 credits of seminar (MSE 520)
- * 9 credits of thesis work (MSE 700)
- * 6 credits of electives (400- or 500-level physical science or engineering courses) to meet the 36 credit requirement.

Non-Thesis Option

- * Three required core courses (9 credits): MSE 510 (3), MSE 525 (3), MSE 541 (3)
- * Four practice-oriented materials or related engineering courses, 12 credits minimum, chosen to complement the student's program.
- * Materials Engineering Project, MSE 598, 4 credits. This is taken during the last quarter of the master's program.
- * Electives to meet the 36 credit requirement.
- * Of the above credits, all must be at the 400 or 500 level, with a minimum of 18 at the 500 level, and other graduate school requirements must be met. Numerical grades are also required for at least 18 credits of 400- or 500-level coursework.

Doctor of Philosophy

Admission Requirements

The applicant must have a minimum grade point average of 3.00 in the last 90 graded quarter hours or the last 60 graded semester hours. Graduate Record Examination (GRE) results are also required for the general test.

In general, entering graduate students with only the B.S. degree will be required to enroll as M.S. students.

Prerequisite:

- * Knowledge of fundamentals of Materials Science and Engineering equivalent to MSE 170
- * Knowledge of crystallography equivalent to MSE 331
- * Background in materials properties equivalent to MSE 362 and MSE 351
- * Knowledge of kinetics equivalent to MSE 322

The department also requires that all entering graduate students have an understanding of thermodynamics equivalent to the level of MSE 421. If the student does not have two undergraduate thermodynamics courses upon entry to the graduate program, then MSE 421 is required for the Ph.D. degree.

Students interested in the Materials Science and Engineering with the Nanotechnology option must make formal application to the UW's Center for Nanotechnology after being admitted to the MSE graduate program.

Degree Requirements

90 credits as follows:

- * 30 credits from M.S.M.S.E. degree or equivalent
- * Three required core courses (9 credits): MSE 510 (3), MSE 525 (3), MSE 541 (3)
- * 6 credits of seminar (MSE 520)
- * 9 credits of elective MSE courses
- * 36 credits of MSE 800
- * Qualifying Exam
- * General Exams
- * Portfolio Review
- * Dissertation
- * Final Exam

Advising and Progress to Degree

The graduate coursework is designed to provide a higher level expertise than a BS in both core topics and specialty areas chosen by the student. This is accomplished by requiring all the students to take three required core courses (MSE 510, MSE 525, and MSE 541) and a series of elective courses. Students are also required to enroll for the department seminar series.

Graduate students are advised by their supervisory/thesis committee chair, members of the supervisory/thesis committee, and the academic counselor, each with a specific advising role. The department also maintains a Graduate Study Program book, given to each graduate student upon entry. Graduate students work closely with their committee chairs. Through this interaction, students develop a professional identity including learning how to do research, defining research problems, research supervision, data analysis and synthesis, presentation and participation in professional meetings, writing papers and reports, writing research proposals, information and advise regarding career options and help with placement.

Financial Support

Graduate students are eligible for a variety of competitive financial awards while they pursue their MSE degrees. Awards include teaching and research assistantships and a broad spectrum of internal and external fellowships. Almost all graduate students receive some financial support. Further details are on the departmental website and in the Graduate Study Program book.

Engineering Materials Option for the Master of Science

The Engineering Materials option for an M.S. in Materials Science and Engineering is a non-thesis program designed for students with substantive industrial experience who want a master's degree to further their career goals or to meet work requirements. Students selecting this degree option should be practicing materials engineers with a Bachelor of Science degree. This program contains practice-oriented courses in addition to the usual graduate core courses. In place of a research-oriented thesis, students carry out a complete analysis and develop recommended solutions to an engineering materials problem. This project is industrially oriented, undertaken at an industrial site and supervised by an experienced engineer in industry and an MSE faculty member. Written and oral final project reports are required. The Engineering Materials option is designed to be completed in one year (four quarters) for on-campus students; it is also available for part-time students through the Education at a Distance for Growth and Excellence (EDGE) program.

Course Descriptions

See page 513.

Mechanical Engineering

143 Mechanical Engineering Building

Mechanical engineering is one of the broadest and oldest of the engineering disciplines and therefore provides some of the strongest interdisciplinary opportunities in the engineering profession. Power utilization (and power generation) is often used to describe the focus of mechanical engineering. Within this focus are such diverse topics as thermodynamics, heat transfer, fluid mechanics, machine design, mechanics of materials, manufacturing, stress analysis, system dynamics, numerical modeling, vibrations, turbomachinery, combustion, heating, ventilating, and air conditioning. Degrees in mechanical engineering open doors to careers not only in the engineering profession but also in business, law, medicine, finance, and other non technical professions.

Undergraduate Program

Adviser
143 Mechanical Engineering Bldg., Box 352600
206-543-5090
meadvise@u.washington.edu

The Department of Mechanical Engineering offers the following program of study:

- * The Bachelor of Science in Mechanical Engineering (B.S.M.E.) degree

Bachelor of Science in Mechanical Engineering

Department Admission Requirements

Applicants are considered in two groups -- Early Admission and Regular Admission. Admission is competitive. Completion of minimum requirements described below does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision. Applications are accepted for autumn quarter only; application deadline is July 1.

Early Admission

1. Course requirements: MATH 124, MATH 125, MATH 126; 10 credits of physical science at the level of PHYS 121, PHYS 122, PHYS 123, or CHEM 142, CHEM 152, or higher; 5 credits of English composition. All courses must be completed prior to the July 1 application deadline. (T C 231 and M E 123 must be taken no later than the academic year of admission.)
2. Applicants must be currently enrolled at the UW and must have completed a minimum of 15 credits taken in residence at the UW.
3. Grade requirements: Minimum 2.0 grade in each course required for admission and minimum 2.50 cumulative GPA for all courses required for admission.

Regular Admission

1. Course requirements: MATH 124, MATH 125, MATH 126, MATH 307; PHYS 121, PHYS 122; CHEM 142, CHEM 152; CSE 142; AA 210; CEE 220; M E 230; T C 231; 5 credits of English composition.
2. 65 credits completed by July 1 application deadline
3. Grade requirements: Minimum 2.0 grade in each course required for admission and minimum 2.50 cumulative GPA for all courses required for admission.

Graduation Requirements

180 credits as follows:

General Education Requirements (85 credits)

1. Written and Oral Communications: 12 credits, to include one 5-credit English composition course from the University list; T C 231; T C 333 (or department-approved alternative).
2. Visual, Literary, and Performing Arts (VLPA), and Individuals & Society (I&S) (24 credits): A minimum of 10 credits is required in each area.
3. Natural World (49 credits):
 - a. Mathematics (24 credits): MATH 124, MATH 125, MATH 126, MATH 307 (or AMATH 351), MATH 308 (or AMATH 352), MATH 309 (or AMATH 353)
 - b. Science (25 credits): CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123

Major Requirements (95 credits)

1. Engineering Fundamentals (31 credits): AA 210; CEE 220; CSE 142; E E 215; IND E 315 (or MATH 390); M E 123; M E 230; MSE 170
2. Mechanical Engineering Core Courses (45 credits): M E 323, M E 331, M E 333, M E 354, M E 355, M E 356, M E 373, M E 374, M E 395, M E 495
3. Mechanical Engineering Option Courses (19 credits)

Student Outcomes and Opportunities

* Learning Objectives and Expected Outcomes:

1. Preparation for the profession. At the end of their undergraduate education, students should possess a tool chest of skills and knowledge that positions them for success as (1) entry-level engineers in existing firms, or (2) graduate students in any program in the country. This does not preclude other activities, such as volunteering, self-employment, or academic study in another discipline. Students succeed in this goal using fundamental science and engineering analysis to solve engineering problems; executing engineering designs; using project management tools; and performing effectively in teams through oral, written, and graphical communication.
2. Contribution to society. Students succeed in this goal by being able to think critically, in the sense of broadly educated individuals; perform independent, informed analysis on issues inside and outside of technology; and continue lifelong learning.

Each student's success is measured by demonstration of the following learning outcomes:

1. (a) Background in mathematics, science and engineering principles. (b) Ability to apply this knowledge to the formulation and solution of mechanical engineering problems
2. (a) Ability to design thermal and mechanical components to achieve a desired goal. (b) Ability to develop, conduct, and analyze experiments or tests that may aid in this design process.
3. Understanding of the necessary professional abilities of a practicing engineer including ethical conduct, teamwork in the pursuit of a goal, and effective communication.
4. Ability to conduct computer-based design and analysis in engineering applications.
5. Exposure to a general educational program that aids in the understanding of and increases the appreciation for the "non-technical" world
6. Realization of the business environment in which engineering is practiced
7. Awareness and necessity of continuing education, graduate study and other life long learning experiences.

Interest groups within the faculty provide instruction in four areas: design; energy and fluids; mechanics, materials and manufacturing; and systems and dynamics. Departmental thrust areas for graduate and undergraduate research include: environment; health care; information technology; and manufacturing. Several on-going senior capstone design projects provide both undergraduate and graduate students with hands-on, interdisciplinary, team-driven opportunities that encompass such diverse topics as Formula SAE car; human-powered submarine, mechatronics, and fuel cell technology.

* **Instructional and Research Facilities:** The department has well-equipped laboratories for pursuing research in various disciplinary fields in mechanical engineering and for fabricating specialized research equipment. These include experimental stress analysis; materials testing/characterization; synthesis and simulation of electromechanical control systems; foundry, welding, and other metal fabrication operations; computer facilities for CAD/CAM/CIM and CFD research; wind tunnels for boundary-layer and high-speed flow analysis; combustion systems performance, exhaust emissions control, and combustion engines; acoustics, vibration, and dynamic testing and measurements and modal analysis; radiation, conduction, and convection (including multiphase) heat-transfer analysis, and a bioengineering flow facility. Visit the department website to view faculty research areas.

* **Honors Options Available:** With College Honors, With Distinction. See department advisers for more information.

* **Research, Internships, and Service Learning:** The department participates in the College of Engineering Co-op Program. The Center for Career Services also lists internship opportunities.

* **Department Scholarships:** The department offers twenty-five or more scholarships each year. Scholarship applications are available on the College of Engineering website. The deadline for scholarship applications is April 1. Sophomores may apply for scholarship consideration before being admitted to the department.

* Student Organizations/Associations:

- o American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
- o American Society of Mechanical Engineers (ASME)
- o Pi Tau Sigma - Mechanical Engineering Honor Society (PTS)
- o Society of Automotive Engineers (SAE)
- o Society of Manufacturing Engineers (SME)
- o Society of Naval Architects and Marine Engineers (SNAME)
- o Society of Women Engineers (SWE)

Graduate Program

Graduate Program Coordinator
143 Mechanical Engineering Bldg, Box 352600
206-543-5090
megrad@u.washington.edu

The Department of Mechanical Engineering offers graduate programs leading to the degrees of Master of Science in Mechanical Engineering (M.S.M.E.) and Doctor of Philosophy (Ph.D.). The department also provides authorized options leading to the College-wide Master of Science in Engineering (M.S.E.) degree. These degrees provide balanced combinations of formal instruction and independent research or design experience. Although there are thesis and non-thesis options for the M.S.M.E., completion of a thesis is highly recommended.

Individual projects may be drawn from a wide spectrum of topics, which include mechanical and energy conservation systems, heat transfer, combustion, fluid mechanics, applied mechanics, computational mechanics, computer-aided design and manufacturing, production systems, materials behavior, robotics, controls, vibrations, and applications of mechanical engineering science to a variety of such interdisciplinary fields as bioengineering, ocean engineering, environmental engineering, nanotechnology, micro electro-mechanical systems, and acoustics. Flexible requirements for course work provide opportunities both for a broad scientific and professional background and for specialty training.

Master of Science in Mechanical Engineering

Admission Requirements

- * **Grade Point Average:** The Graduate School requires applicants hold a GPA of at least 3.00 for the last 90 quarter hours or 60 semester hours of graded undergraduate coursework to receive consideration for admission. The Department of Mechanical Engineering prefers an overall undergraduate GPA of at least 3.20. In addition, the department prefers that Ph.D. applicants have M.S. grade point averages of 3.50 or better.
- * **Quality and difficulty of courses taken and universities and colleges attended**
- * **GRE General Test:** The Department of Mechanical Engineering requires the following minimum GRE scores: 450 Verbal (350 if English is not a native language), 650 Quantitative, and 575 Analytical. The minimum for the new Analytical Writing test is 4.0.
- * **Three letters of recommendation**
- * **Statement of purpose**
- * **Official transcripts from all colleges/universities attended**
- * **Professional experience, if applicable**
- * **English requirements for foreign nationals:** The Department of Mechanical Engineering requires TOEFL scores for foreign nationals whose native language is not English, with a minimum score of 580 for the paper exam and 237 for the computer-based exam.

Degree Requirements

42 credits, as follows:

- * **Thesis option students must register for 12 credits of thesis research and 30 credits of related numerically graded coursework. Non-thesis option students must take all 42 credits in numerically graded courses.**
- * **Course grades must be 2.7 or above**
- * **At least 12 credits for the thesis option and 18 credits for the non-thesis option must be taken in 500-level mechanical engineering courses. These must include 6 credits of mathematical and engineering analysis requirements: M E 564 and M E 565.**

- * At least 3 credits of computational or numerical analysis must be taken from the following list of approved courses (or from an approved plan of individual study conducted as part of thesis research): M E 535, AA 509, A A 540, CESM 504, E E 517, AMATH 584
- * The remaining credits (18 for thesis-option students and 24 for non-thesis option students) may be from other departments, and may include a maximum of 9 credits at the 400 course level (excluding M E 498 and M E 499). Courses from other departments should be closely related to the student's overall plan, and should be drawn from the following departments: engineering departments, mathematical and computational sciences departments, physical sciences departments, or approved biological sciences departments.
- * Non-thesis option students may substitute up to 6 credits of M E 599 Special Projects (not to be confused with the class M E 599) for 6 credits of classroom courses. Permission forms for project proposals can be obtained from the Mechanical Engineering Student Services Office. The student must write a research paper under the supervision of a faculty member and the credits must be taken for a numerical grade.

Please note: For thesis-option students, special projects course like M E 599 and M E 600 do not count toward the 42-credit total unless the project is recommended by the student's faculty supervisor and pre-approved by the Graduate Program Coordinator. Seminar Requirement: All full-time students must register for a seminar course every quarter while in the Master's Program. Quarterly registration for seminars is necessary for satisfactory progress in the program, but does not count toward the 42 credits of numerically-graded coursework and thesis research required for graduation.

Doctor of Philosophy

Admission Requirements

- * Grade Point Average: The Graduate School requires applicants have a minimum GPA of 3.00 for the last 90 quarter hours or 60 semester hours of graded undergraduate coursework to receive consideration for admission. The Department of Mechanical Engineering prefers an overall minimum undergraduate GPA of 3.20. In addition, the department prefers that Ph.D. applicants have a minimum M.S. grade point averages of 3.50.
- * Quality and difficulty of courses taken and universities and colleges attended
- * GRE General Test: The Department of Mechanical Engineering requires the following minimum GRE scores: 450 Verbal (350 if English is not a native language), 650 Quantitative, and 575 Analytical. The minimum for the new Analytical Writing test is 4.0.
- * Three letters of recommendation
- * Statement of purpose
- * Official transcripts from all colleges/universities attended
- * Professional experience, if applicable
- * English requirements for foreign nationals: The Department of Mechanical Engineering requires TOEFL scores for foreign nationals whose native language is not English, with a minimum score of 580 for the paper exam and 237 for the computer-based exam.

Degree Requirements

90 credits, as follows:

- * Advisory Committee: During the first year of post-master's study, the student should select a two- to three-person Advisory Committee from the Mechanical Engineering department.
- * Coursework: All new post-master's students must successfully complete two to three graduate courses per quarter in their first year of study, as approved by the Advisory Committee. Normally this includes a sequence in advanced applied mathematics.
- * Seminar Requirement: Post-master's students register for the Mechanical Engineering seminar (M E 520), in the autumn quarter of their matriculation year. Otherwise, students are encouraged to register for engineering seminar courses offered by other UW engineering programs, i.e. M E 518, M E 523, M E 591, AMATH 501, IND E 591/IND E 592/IND E 593, MSE 520. Seminar must be taken on a quarterly basis throughout the entire Ph.D. program.
- * Research: Post-Master's students must conduct initial research in their first year of study under the direction of the Advisory Committee. This requirement applies even if the student holds a teaching assistantship.
- * Qualifying Exam: Every full-time student in the Department's Ph.D. program is required to take the examination within one calendar after entry into the program.

- * Supervisory Committee: A graduate student is not considered a doctoral student until a Supervisory Committee has been appointed by the Dean of the Graduate School. Students need to provide the name of the committee chair, Graduate School Representative (GSR), and at least two mechanical engineering faculty for approval to the Graduate Program Coordinator (GPC). This committee must be established before the end of the second year of Ph.D. study and no less than four months prior to scheduling the General Examination. This committee replaces the first-year Advisory Committee.
- * Dissertation Proposal: A dissertation proposal is prepared after the student has conducted one or two quarters of in-depth research, during which time the student should meet frequently with the Committee Chair. Submit copies of the proposal to all members of the supervisory committee prior to the exam. The proposal must be approved by the Committee Chair before being able to schedule the General Exam.
- * Dissertation Research: Registration for a minimum of 27 credits of dissertation research is required over a period of at least three quarters - and at least two quarters after the General Exam.
- * Reading Committee: The Reading Committee consists of three members drawn from the Supervisory Committee.
- * Final Exam
- * Dissertation Defense

Research Facilities

The department has well-equipped laboratories for pursuing research in various disciplinary fields in mechanical engineering and for fabricating specialized research equipment. These include experimental stress analysis; materials testing/characterization; synthesis and simulation of electromechanical control systems; foundry, welding, and other metal fabrication operations; computer facilities for CAD/CAM/CIM and CFD research; wind tunnels for boundary-layer and high-speed flow analysis; combustion systems performance, exhaust emissions control, and combustion engines; acoustics, vibration, and dynamic testing and measurements and modal analysis; radiation, conduction, and convection (including multiphase) heat-transfer analysis, and a bioengineering flow facility. Visit the department website to view faculty research areas.

Financial Aid

Financial aid is offered to full-time graduate students as funds permit. Funds, however, are limited and the assignment of assistantships and fellowships is highly competitive. This aid may be in the form of a research assistantship for sponsored programs, a fellowship provided by the University or industry, or a teaching assistantship.

Course Descriptions

See page 515.

Technical Communication

14 Loew

Technical communicators use their language, visual, and analytical skills, as well as training and research in electronic and other media, to create and enhance communication in scientific and technical environments. Technical communication prepares students to design, create, edit, and evaluate technical and scientific discourse. The department provides coursework in the development of online help systems and in the design of general-audience content for delivery by means of advanced communication technologies such as the Web.

The complexities of modern life have greatly increased the number of people who need to communicate about technical and other specialized topics. Scientific journal articles, manuals, proposals, and other genres are important for a vast array of readers. With the Information Age, gaining and sharing technological understanding and capability has become a crucial human activity. We communicate in more genres, address broader (often global) audiences, and face more complex rhetorical problems than ever before.

To achieve success in their communication activities, progressive organizations are employing sophisticated planning and development methods, including user-centered design and evaluation, content management, and systems-based analyses. In addition, they undertake research projects and apply existing research to their own needs. Contemporary research in technical communication ranges from controlled

empirical research on the processing of text, graphics, and multimedia content to observational research on how meaning is created and negotiated in business environments and virtual communities.

Other major interests include the human-computer interface, hypermedia, communications technology, the rhetoric of technical discourse, international communication, visual communication, publications and communications management, policy analysis of technological systems, and research and testing.

Undergraduate Program

Adviser
211 Engineering Annex, Box 352195
206-543-1798 or 206-616-0797
tcadvise@u.washington.edu

The Department of Technical Communication offers the following programs of study:

- * The Bachelor of Science in Technical Communication degree
- * A minor in technical Japanese

Bachelor of Science in Technical Communication

Suggested First-Year College Courses: T C 231, approved math or statistics (see list on T C Web site), approved science (see list on T C Web site)

Department Admission Requirements

Applicants are considered in two groups -- Early Admission and Upper-Division Admission. Admission is competitive. Completion of minimum requirements does not guarantee admission. All applicants have the right to petition and appeal the department's admission decision.

Early Admission

1. Course requirements: 38 credits to include 10 credits of approved mathematics or statistics; 15 credits of approved natural science; and 13 credits of approved written and oral communication (including T C 231). All courses must be completed prior to the July 1 application deadline.
2. Applicants must be currently enrolled at the UW and must have completed a minimum of 15 credits taken in residence at the UW. Application deadline is July 1 for autumn quarter only.
3. Grade requirements: Minimum 3.00 GPA in written and oral communications courses and minimum 2.00 cumulative GPA.

Upper-Division Admission

1. Course requirements: 10 credits of approved mathematics or statistics; 15 credits of approved natural science; and 13 credits of approved written and oral communication (including T C 231). All courses must be completed prior to the July 1 application deadline.
2. 60 credits completed by application deadline, which is July 1 for autumn quarter and February 1 for spring quarter.
3. Students applying in the senior year must spend a minimum of four quarters in the program.
4. Grade requirements: Minimum 3.00 GPA in written and oral communications courses and minimum 2.00 cumulative GPA.

Graduation Requirements

180 credits as follows:

General Education Requirements (93 credits)

1. Written and Oral Communications (13 credits): 5 credits of English composition from the University list; T C 231; 5 credits of oral/written communication from T C list (see adviser).
2. Visual, Literary, & Performing Arts (VLPA), and Individuals & Societies (I&S) (30 credits): A minimum of 10 credits is required in each area.
3. Math and Natural Science (50 credits):
 - a. Mathematics (minimum 15 credits; see list of qualifying courses on T C Web site)
 - b. Science (minimum 15 credits; see list of qualifying courses on T C Web site)

Major Requirements (82 credits)

1. Technical Communication Core (51 credits): T C 310, T C 400, T C 401, T C 402, T C 403, T C 407, T C 411, T C 412, T C 437, T C 493, T C 495
2. Technical/Analytical (12 credits): Must include either CSE 142 or PHIL 120.
3. Approved Electives (19 credits): Must demonstrate a coherent and relevant area of specialization.

Free Electives (5 credits)

Minor

Minor Requirements: Technical Japanese: Minimum of 25 credits to include T C 461 (5), T C 462 (5), T C 463 (5), plus 10 credits from the approved list of elective courses. For more information, contact the Technical Japanese Office, 13 Engineering Library.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The department has identified several areas of competency for students. By achieving mastery in all these areas, upon graduation TC students are well prepared to advance to careers in technical communication, apply to top graduate programs, and conduct research in the field.

Graduates are able to:

- o Understand the TC field
- o Write and edit at a professional level
- o Analyze communication situations and problems in scientific and technical settings
- o Identify and work with the major genres of technical communication
- o Use appropriate tools and technologies to develop communication solutions
- o Understand and use principles for effective display of information
- o Understand and practice effective content development
- o Manage TC projects effectively
- o Work effectively on teams
- o Be sensitive to relevant larger contexts and environments

The Department of Technical Communication prepares students to assume positions of intellectual leadership in industry, government, and non-profit organizations. Students also specialize in science writing or Web site design. The Technical Japanese program provides a unique opportunity to develop cross-cultural experience and expertise.

Whatever their professional direction, technical communication students learn the newest communication technologies and practices, the most effective information-design strategies, and the research skills appropriate to their interests. They also learn the enduring theory and principles that enable them to understand the constant changes they will encounter throughout their careers. Finally, their coursework takes place in the context of social and political issues and human needs.

- * *Instructional and Research Facilities:* Department facilities include the T C Computer Lab, Technical Japanese Computer Lab, Laboratory for Usability Testing and Evaluation (LUTE), and the Engineering/iSchool Writing Center (EiWC).

- * *Honors Options Available:* With College Honors. With Distinction. See adviser for details.

- * *Research, Internships, and Service Learning:* All Technical Communication undergraduates are required to complete at least one 3-credit internship. The supervised internship in a publications organization must be approved by the faculty adviser. As an internship substitution, students may elect to take part in a six-month co-op, sponsored by the Engineering Co-op program. Additionally, undergraduates are invited to work in research groups with TC grad students and faculty.

- * *Department Scholarships:* Annually, T C selects one recipient of a College of Engineering Scholarship. The criteria for this scholarship are the applicant's prior academic history and likelihood for success in the technical communication field. Additionally, the Society for Technical Communication (STC) offers annual scholarships open to all students enrolled in a T C-related program.

- * *Student Organizations/Associations:* Students in the Technical Communication degree program often participate in the Student Chapter of the Society for Technical Communication (STC), the Minority Science

and Engineering Program (MSEP), and Women in Science and Engineering (WISE).

Of Special Note: The T C department is a small, academic community. Students generally call their professors by their first name and have the opportunity to work individually on projects and research supervised by T C faculty. Undergraduate students are encouraged to work in research groups and to attend conferences and professional meetings.

Graduate Programs

Graduate Program Coordinator
14 Loew, Box 352195
206-543-2567
tcadvise@u.washington.edu

Master of Science in Technical Communication

Technical Communication offers a Master of Science in Technical Communication (M.S.T.C.). (An evening program is offered through UW Educational Outreach.) A total of 41 credits is required for the M.S.T.C. degree, which includes 29 credits of required T C graduate courses and 11 credits of approved electives. M.S.T.C. students may elect to pursue a master's thesis or project report with the approval of their supervisory committee.

Admission Requirements

In making recommendations for admission, the faculty consider the following from an applicant's record: (1) undergraduate GPA; (2) undergraduate degree program and work experience; (3) the Graduate Record Examination (GRE) Verbal score; (4) the Test of English as a Foreign Language (TOEFL) score (if applicable); (5) letters of recommendation; and (6) Statement of Goals and Career Objectives. A limited number of prerequisite undergraduate courses may be required.

Degree Requirements

41 credits, as follows:

The course of study must include:

- * Two courses in Theory (min. 8 cr)
- * Two courses in Research Methods (min. 8 cr)
- * Coursework in Society and Systems (min. 4 cr)
- * Coursework in New Media Design and Applications (min. 8 cr)
- * Electives (no minimum)
- * One seminar (min. 1 cr)

Students must complete the M.S.T.C. program within three years of admission; most finish within one to two years. Students who wish to propose a master's thesis (T C 700) or internship with report (T C 601) should consult with the adviser.

The required T C graduate courses include the following: T C 501 (4); T C 502 (4); T C 510 (4); either T C 516 (4) or T C 517 (4); either T C 505 (4), T C 512 (4), or T C 520 (4); T C 521 (1-2, max. 3).

Other courses that fulfill requirements in the four categories (Theory, Research Methods, Society and Systems, and New Media Design and Applications) must be approved by the student's supervisory committee chair. Courses may include coursework not only in engineering, but also in fields such as computer science, cognitive science, psychology, linguistics, behavioral science, as well as other disciplines at the UW.

Inter-Engineering Master's in Technical Japanese

The Inter-Engineering Master's in Technical Japanese is a two year inter-engineering master's degree program that combines the study of engineering and technical Japanese in a high-tech learning environment. It is the only program of its kind in the country.

Students take classes in an engineering specialty and in advanced Japanese. They spend summer quarter after their first year in Japan doing a required internship in a Japanese company or research lab. Some internships are longer. Students graduate with an Inter-Engineering M.S.E. or M.S. degree.

Applicants who do not have an engineering or other high-tech background can follow the technical communication track and graduate with the inter-engineering M.S. degree.

Admission Requirements

To be admitted, students should have at least three years of college-level Japanese language study or the equivalent. The Japanese Proficiency Test is required for all applicants and should be taken no later than two weeks before the application deadline. If applicants are unable to make arrangements to take the test before the application deadline, they need to contact the program coordinator.

Degree Requirements

54 credits, as follows:

- * *Engineering Fields:* Students must select an engineering field (usually the same as your undergraduate area of concentration) from among the following:
 - o Aeronautics and Astronautics
 - o Bioengineering
 - o Chemical Engineering
 - o Civil and Environmental Engineering
 - o Computer Science and Engineering
 - o Electrical Engineering
 - o Materials Science
 - o Mechanical Engineering
 - o Technical Communication
- * *Credit Requirements:*
 - o Distribution: 24 credits in one engineering specialty, 27 credits of coursework in Technical Japanese, and 3 credits of summer internship in Japan. Note: 3 credits of internship may be substituted for 3 credits of coursework.
 - o Technical Japanese coursework:
 - + Oral Communication in Technical and Business Settings: T C 471 (3), T C 472 (3), T C 473 (3)
 - + Reading Techniques in Technical Japanese: T C 461 (3), T C 462 (3), T C 463 (3)
 - + Advanced Japanese for Technical and Business Professionals: T C 561 (3), T C 562 (3), T C 563 (3)

Doctor of Philosophy

The goals and objectives of the T C Ph.D. program are as follows:

- * To prepare individuals for a career as researchers, teachers, and intellectual leaders in the discipline of technical communication
- * To foster the development and dissemination of new knowledge in technical communication
- * To foster the development of an international, multi-cultural perspective and a diverse, inclusive student body and workforce in technical communication
- * To invent new technical and strategic solutions to technical communication problems

By completion of the course of study, technical communication doctoral students are able to:

- * Analyze a communication situation in its full complexity
- * Select or develop an appropriate theoretical framework to motivate an understanding of the situation
- * Select an investigative method from a broad range of methods and effectively use it for conducting an inquiry.
- * Confront specific communication problems and create solutions for them that can be defended theoretically
- * Translate theory and research findings into technical or strategic inventions for solving communication design problems

Admission Requirements

Students may be admitted to the T C Ph.D. program after completing either an undergraduate degree or a master's degree in T C or a relevant field (up to 30 credits of master's work may be applied toward the 105-credit requirement). Because T C is a relatively new discipline, applicants can be expected to represent a wide range of backgrounds.

Applicants must submit the following:

- * UWTC Ph.D. admission forms
- * Official transcripts of all academic study
- * Evidence of a minimum GPA of 3.00
- * Three letters of recommendation
- * A curriculum vitae
- * A personal statement of objectives and research area of interest.

International students will also be required to submit a TOEFL test score of at least 600, obtained within the last two years.

Degree Requirements

105 credits, as follows:

- * After having completed 30 credits of coursework, pass a Preliminary Exam. (Those who do not pass the preliminary exam for Ph.D. study may proceed to finish a terminal master's degree.)
- * Select Committee Chair within two quarters of passing Preliminary Exam.
- * Successfully complete all course distribution and credit-hour requirements.
- * Successfully complete the requirements for directed research.
- * After having completed 60 credits, pass a General Examination to attain formal candidacy for the Ph.D. program (Candidate's Certificate).
- * Successfully defend a dissertation proposal before a Supervisory Committee.
- * Successfully defend the dissertation itself before a Reading Committee (Final Exam).

Students are encouraged but not required to teach; if they do teach, they are required to take the teaching seminar, T C597.

Course Distribution

The coursework exposes students to the literature and multidisciplinary perspectives of the field; the coursework requirements are distributed across four main thematic areas: theory, research methods, media design and applications, and society and systems. In their coursework, students encounter the main themes and intellectual diversity of the field and learn to reason about the claims of the main perspectives. Students use elective credits to broaden their perspectives or gain more depth in disciplines closely related to TC. The specific required core courses and other coursework requirements in the four thematic areas that all TC Ph.D. students are expected to take include the following:

- * *Theory*: Four courses that are 3 or more credits, as follows: T C 501 (4), T C 502 (4), additional approved theory courses
- * *Research Methods*: Three courses that are 3 or more credits, as follows: T C 516 (4) or T C 517 (4); additional approved research methods courses

- * *Media Design and Applications*: Three courses that are 3 or more credits, as follows: T C 510 (4), T C 511 (5), additional approved media design courses
- * *Society and Systems*: Three courses that are 3 or more credits, from the following: T C 505 (4), T C 512 (4), T C 520 (4), other approved society and systems courses

The following tables present a summary of the credit-hour requirements for the TC Ph.D., a list of courses that meet the coursework category requirements, and a sample full-time and part-time pathway.

Credit-Hour Requirements

- * 46 credits minimum of core distribution requirements
- * 12 credits of directed research (T C 596)
- * 20 credits minimum approved electives (30 credits max.)
- * 27 credits minimum dissertation

A student entering with a master's degree in Technical Communication may use up to 30 credits from that degree towards the Ph.D. requirements. These 30 credits may be applied toward the core distribution requirements or toward the elective credits, as appropriate and as approved by the graduate adviser.

Research Facilities

The Department of Technical Communication has a well-equipped computer laboratory that effectively supports its courses and research projects. In addition, there are two specialized departmental research laboratories: the Technical Japanese Lab and the Laboratory for Usability Testing and Evaluation (LUTE). An award-winning magazine, Northwest Science and Technology, is produced in the department and serves as a laboratory for science-writing students. Finally, technical communication graduate students can utilize significant College of Engineering and University-level research facilities.

Financial Aid

A limited number of teaching and research assistantships and scholarships are available for the financial support of graduate students in technical communication. More information and application forms can be obtained by contacting the department.

Course Descriptions

See page 519.

College of Forest Resources

Dean

B. Bruce Bare
107 Anderson

Associate Dean for Academic Affairs

Stephen West
123 Anderson

The College of Forest Resources, through teaching, research, and outreach, generates and disseminates knowledge for the stewardship of natural and managed environments and the sustainable use of their products and services. Its vision is to provide internationally recognized knowledge and leadership for environmental and natural resource issues.

Founded in 1907, when forestry education was in its infancy, the College holds a position of national and international leadership in both instruction and research. Its location in one of the world's largest forest regions provides students access to a unique urban-to-wild world-class laboratory in which to study the multiple dimensions of natural resource science and management. Approximately 250 undergraduate and 175 graduate students are enrolled, taught by more than 50 faculty members. Students enjoy small classes and close association with faculty, as well as the diversity and superior facilities of a large research university.

The College's programs focus on the sustainability and functionality of complex natural resource and environmental systems using an integrated, interdisciplinary approach across multiple scales involving the urban-to-wildland gradient. Its programs serve society generally, and natural resource professions in particular, with graduates well equipped to contribute to discussions and solutions to resource problems facing the region and the world. Interdisciplinary research and outreach centers and cooperatives include the Center for International Trade in Forest Products (CINTRAFOR), the Center for Water and Watershed Studies (CWWS), the Center for Urban Horticulture (CUH), the Olympic National Resources Center (ONRC), the Rural Technology Initiative (RTI), Stand Management Cooperative (SMC), Precision Forestry Cooperative, and Urban Ecology Interdisciplinary graduate program. For current information on all these centers and cooperatives, please visit www.cfr.washington.edu/research/index.html.

Facilities

The College occupies three central Seattle campus buildings: Alfred H. Anderson Hall, the Hugo Winkenwerder Forest Sciences Laboratory, and Julius H. Bloedel Hall. In addition, the Center for Urban Horticulture is located near the Union Bay natural area.

The Center for Urban Horticulture maintains a library that serves students, faculty, landscape professionals, and the public. The Center's herbarium supports fieldwork in urban horticulture, restoration ecology, and dendrology. Containing representative plant material from all parts of the United States, the collection includes dried, mounted specimens of shrubs, hardwood trees, and conifers. Another herbarium, complete in plants native to the Pacific Northwest and maintained by the Department of Biology, is available for use by the College's students.

The College's laboratory facilities represent an extensive array of modern equipment for research, including optical equipment, electronic instrumentation for a wide variety of uses, gas chromatographs, spectrophotometers, and physical-test equipment. Specific laboratories are designed to study soil chemistry and soil physics, hydrology, polymer chemistry, tree physiology, genetics, wood and extractives chemistry, physics of fibrous composites, applied mechanics, wood process technology, silviculture, ecology, paleoecology, pathology, entomology, wildlife, landscape management systems, horticultural physiology, and horticultural plant materials.

The College computing facilities include computer systems dedicated to specific research areas, a computer student laboratory, a geographical information systems (GIS) laboratory, and a local-area network with several servers offering access to the Internet and printers.

Office of Student and Academic Services

Director, Student and Academic Services
Michelle M. Trudeau
116 Anderson
cfradv@u.washington.edu

The Office of Student and Academic Services in the College of Forest Resources assists prospective students with admission to the College and advises current students, including interpretation of College and University requirements and assistance in course planning. Faculty advisers assist students in choosing elective courses to help build an appropriate academic background for their chosen specialty.

The office keeps job listings and employer resources to help students obtain summer employment and internships while in school and permanent employment upon graduation. The office also sponsors a career fair every January. Although field experience is not required for graduation, students are strongly urged to seek summer employment or field experience relevant to their career goals.

Research Programs

Areas of research are closely tied to the College's graduate programs. These include forest policy analysis; stand management; streamside and riparian zone management; forest ecosystem analysis; international trade in forest products; business, economics, and quantitative management; forest biotechnology; wildlife science; forest soils; urban and environmental horticulture; forest engineering; hydrology; and paper science and engineering.

Outreach Programs

The College, through its interdisciplinary centers and through collaboration with Cooperative Extension of Washington State University, undertakes and promotes continuing public and professional education for citizens of the state.

Field Facilities

College field facilities include two major forested areas covering more than 4,000 acres, an arboretum, a natural area, and several cooperative research centers and stations. These lands offer a wide variety of terrestrial and aquatic characteristics favorable to a full range of scientific investigations. They also provide a natural-science laboratory for the many disciplines in the College concerned with the research and teaching of natural resources science and management.

The 4,200-acre Charles Lathrop Pack Experimental Forest is located 65 miles south of the University, near Eatonville, Washington. Broad forest and soil diversity in this area has led to extensive biological, management, and engineering research. A full-time resident staff manages this facility, harmonizing its public-education objectives with academic and research objectives. Rustic but comfortable facilities which provide housing and support to research programs are also used extensively for conferences both within and outside the University. The College is establishing a new Center for Sustainable Forestry at Pack Forest to be charged with discovering, teaching, and demonstrating the concepts of sustainable forestry, with special emphasis on the College's strategic themes of sustainable forest enterprise and sustainable land and ecosystem management in an urbanizing world.

The Olympic Natural Resources Center (ONRC) is a 19,000-square-foot research and education facility located on the west side of the Olympic Peninsula. The mission of the center is to conduct research and education on natural-resources management practices which integrate ecological and economic values. Innovative management methods that integrate environmental and economic interests into pragmatic management of forest and ocean resources are demonstrated. A forest management program as well as a marine program are in place to study the relationship between the terrestrial and marine environment.

The Wind River Canopy Crane is a 250-foot research crane set in old-growth forest canopy in southwestern Washington state. It is the largest canopy crane in the world and the first in a temperate forest. A research partnership between the College of Forest Resources and the U.S. Forest Service, it provides graduate students and faculty opportunities for on-site research and field trip opportunities for undergraduates.

The Lee Memorial Forest, approximately 160 acres, is located about 22 miles northeast of the University, near Maltby. This forested property provides valuable academic and research opportunities near the campus. Characterized by forest types and soils common to western Washington lowlands, Lee Forest is used extensively for short field trips and for long-

term research and demonstration projects especially related to changing land uses.

The Allan E. Thompson Research Center and the Joe E. Monahan Findley Lake Reserve and Research Area in the Cedar River watershed are utilized by the College in cooperation with Seattle Public Utilities for studies in forest physiology and mineral cycling in the forest ecosystem.

The Center for Urban Horticulture has offices, laboratories, public-education resources, and field sites for teaching and experimentation along the shore of Union Bay. Its 10-acre Union Bay Gardens emphasize unusual ornamental and native woody landscape plants. The 60-acre Union Bay Natural Area, a former dumpsite now a naturalized habitat, is used by University classes and the public to study principles and practices of restoration ecology. The Douglas Research Conservatory is a modern plant-growing facility with greenhouses, growth chambers, nursery, and classrooms. The Otis Douglas Hyde Hortorium is an herbarium dedicated to plants of urban horticultural significance. The Miller Seed Vault stores seeds of Washington's rare and endangered native plants in support of restoration and research projects. The Elisabeth C. Miller Horticultural Library is the Northwest's foremost public horticultural library, with books, journals, and other materials available to the gardening public, students, and professional horticulturists. The Center also conducts courses, lectures, and special events for the public and professionals as part of the College's outreach program. Cooperative programs are in place with Washington State University/King County Cooperative Extension, whose horticulture program is housed at the Center.

The Center for Urban Horticulture's largest facility is the Washington Park Arboretum, a 230-acre collection of trees and shrubs in a naturalistic setting on the south shore of Lake Washington. Managed in cooperation with the City of Seattle Department of Parks and Recreation, the arboretum contains some 5,200 different kinds of woody plants that are available for research and academic study, making it the third most diverse arboretum in the United States. Displays and programs educate students and visitors about woody plants' diversity, natural ecology, and urban landscape use, as well as conserving endangered natural and cultivated plants. Classes in botany, dendrology, horticulture, wildlife, and landscape architecture make use of the collections, while the grounds are used for studies in soil science, ecology, and various research projects, including many independent student projects. The arboretum, established in 1934, also serves as an important public-service area to the University, offering numerous formal and informal classes for the general public and, in addition, serving the community as a public park and open space.

Undergraduate Program

Adviser
116 Anderson
206-543-3077
cfradv@u.washington.edu

The College of Forest Resources offers the following programs of study:

- * The Bachelor of Science in Forest Resources degree with a major in environmental science and resource management.
- * The Bachelor of Science in Forest Resources degree with a major in paper science and engineering. Paper science and engineering has ABET accreditation which is recognized by the Council on Postsecondary Accreditation and the U.S. Department of Education as the accrediting agency for engineering in the United States.
- * Minors in environmental science and resource management; and streamside studies.

Bachelor of Science in Forest Resources

Suggested First- and Second-Year College Courses:

- * *Environmental Science and Resource Management:* T C 231, ENGL 131 (or other 5-credit English composition course); COM 220; BIOL 161-BIOL 162; CHEM 120, CHEM 220; any 5-credit VLPA course; MATH 120 or Q SCI 291; ESRM 210.
- * *Paper Science and Engineering:* CHEM 142, CHEM 152, CHEM 162, CHEM 237, CHEM 238; ECON 200; ENGL 131 (or other 5-credit English composition course); CHEM E 260; MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122, PHYS 123; Q SCI 381; PSE 201, PSE 202, and PSE 450.

Department Admission Requirements

- * *Environmental Science and Resource Management:* Students in good academic standing may declare this major at any time.
- * *Paper Science and Engineering:* Students may apply for freshman admission or upper-division admission. Applications are available in Student and Academic Services, 116 Anderson, or through the College of Engineering, 356 Loew, or by visiting the College Web site. Departmental deadlines are July 1 for autumn quarter, October 15 for winter quarter, and January 15 for spring quarter. Admission is competitive; completion of requirements does not guarantee admission.

Graduation Requirements

Environmental Science and Resource Management

180 credits as follows:

1. General Education Requirements (65-66 credits)
 - a. Written Communication (12 credits): 5 credits English composition (ENGL 131 preferred); minimum 7 additional credits of writing-intensive coursework to include T C 231; and T C 333 (or equivalent).
 - b. Quantitative and Symbolic Reasoning (20 credits): Q SCI 291, Q SCI 292, Q SCI 381; ESRM 250.
 - c. Natural World (23-24 credits): BIOL 161 and BIOL 162, or BIOL 180 and BIOL 200; CHEM 120 and CHEM 220, or CHEM 142 and CHEM 152; ESC 210 or ESC 311.
 - d. Visual, Literary, & Performing Arts (VLPA) (10 credits): COM 220; 5 additional credits from the University VLPA list.
 - e. Individuals & Societies (I&S): 10 credits required, all of which are satisfied by core courses shown below.
2. Major Requirements (55 credits)
 - a. Core Courses (20 credits): ESRM 301, ESRM 302, ESRM 303, ESRM 304.
 - b. Restricted Electives (35 credits): 300- or 400-level courses from within the College of Forest Resources. 15 of the 35 credits must be at the 400 level. See College Web site for possible pathways.
 - c. Free electives: As needed to bring minimum total to 180 credits.

Paper Science and Engineering

1. General Education Requirements (91 credits)
 - a. Written Communication (8 credits): 5 credits English composition (ENGL 131 preferred); T C 231 (3 credits). (Additional 5 credits satisfied by PSE courses shown below.)
 - b. Mathematics and Statistics (23 credits): MATH 124, MATH 125, MATH 126, MATH 307; Q SCI 381 or STAT 311.
 - c. Supporting Sciences: (43 credits): CHEM 142, CHEM 152, CHEM 162; CHEM 237, CHEM 238; CHEM E 260; PHYS 121, PHYS 122, PHYS 123.
 - d. Visual, Literary, & Performing Arts (VLPA) (10 credits): Chosen from the University VLPA list.
 - e. Individuals & Societies (7 credits): ECON 200; 2 credits from the University I&S list; (3 additional credits satisfied by required PSE courses.)
2. Major Requirements (64-65 credits)
 - a. Chemistry and Chemical Engineering (18 credits): CHEM 455; CHEM E 310, CHEM E 330, CHEM E 340, CHEM E 436.
 - b. Paper Science Courses (46-47 credits): PSE 201, PSE 202, PSE 248, PSE 402, PSE 404, PSE 406, PSE 450, PSE 476, PSE 477, PSE 478, PSE 479, PSE 480, PSE 481, PSE 482, PSE 487, PSE 497. All required PSE courses must be completed with at least a 2.0 grade.
 - c. Electives
 - i. Technical Electives or Business Option (12 credits minimum).
 - ii. Free electives to bring minimum total to 180 credits.

Minors

Environmental Science and Resource Management

Minor Requirements: Minimum 25 ESRM credits, 20 of which must be upper division. A maximum of 5 credits from PSE courses allowed.

Streamside Studies

Minor Requirements: Minimum 28 credits with a grade of at least 2.0 in each course:

1. Core courses: ESS 101, ESS 210, ESS 230, ESS 326 or ESS 401; ESRM 303 or BIOL 356; F E 425 or CEE 476; and FISH 312 or FISH 450

2. 3 credits of ESRM/FISH 429
3. 10 credits from one of the following thematic areas:
 - a. Physical Processes: ATM S 301, ATM S 321, CEE 350, CEE 366, CEE 462, CEE 474, CEE 485, ENVIR 313/ESS 315, ESC 210, ESC 311, and ESS 426.
 - b. Ecological Processes: BIOL 472, BIOL 473, BIOL 474, CEE 461, ESC/BIOL 333, ESC 441, ESC 450, FISH 454, F M/FISH 328, FISH 311, FISH 312, FISH 323, FISH 428, FISH 430, FISH 450, FISH/Q SCI 456, FISH/BIOL 438, EHUF 473, EHUF 475, and F M 425.
 - c. Social Processes: ANTH 457, ESRM 400, ECON 435, F M 271, F M 464, ESRM 470, GEOG 370, and ENVIR 418.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* Forest resources emphasizes interactions between biotic and human systems at landscape to regional scales. It also provides a knowledge base to answer critical questions about how individual organisms and biotic systems respond to perturbations and stresses imposed by human activities, as well as how the environment affects human behavior and institutions. This knowledge enables the design of methods for the conservation, restoration, and sustainable use of biotic systems, and is critical for environmental decision making.

The goal of the paper science and engineering curriculum is to provide students with the training, tools, and experiences needed to be successful professionals in the pulp, paper, and allied industries. At the same time, it provides a comprehensive education so graduates can effectively work and live in the world's complex society.

The goal of the environmental science and resource management curriculum is to present fundamental knowledge and problem-solving experiences that enable students to understand the interdisciplinary dimensions of natural resource and environmental sciences and management. The structure of this curriculum provides great flexibility for students to pursue specialized fields such as wildlife conservation, wildlife ecology, urban ecology, sustainable forest management, wildland ecosystem conservation and management, restoration ecology, and environmental horticulture, or to construct a broader educational package to fit their educational goals.

Career opportunities abound in the area of environmental science and resource management in both private and public sectors. One example is the projected need in the U.S. Forest Service, where it is estimated that one-third of the workforce will be retiring within the next five years.

- * *Instructional and Research Facilities:* See the main College page for details.
- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See adviser for requirements, or link to www.cfr.washington.edu/acad/undergrad/honors.htm

Research, Internships, and Service Learning: The Office of Student and Academic Services regularly receives internship announcements, which are forwarded on to all CFR students via email and placed in the office's Career Corner. Students are strongly encouraged to pursue these opportunities, which include work experience with federal, state, and private organizations in environmental science, forestry, engineering, conservation, wildlife, horticulture, and other related fields.

Undergraduate research opportunities are available to students. Please contact faculty members in your area of interest. There are also foreign study and field opportunities within the College. Some are formal study with faculty members, others are through other agencies. Contact the Office of Student and Academic Services for more information.

- * *Department Scholarships:* The College of Forest Resources has a strong scholarship program for majors which provides in-state tuition to students, based on merit or need. Application information can be found at www.cfr.washington.edu/Acad/Scholarship.htm.

The Washington Pulp and Paper Foundation provides scholarships for students enrolled in the Paper Science and Engineering curriculum. For information about these scholarships, contact Professor William McKean, 318 Bloedel.

- * *Student Organizations/Associations:* The College has student organizations which organize student symposia, field trips, parties, slide shows and talks, public service projects, and other social activities. Current CFR

student organizations can be found at www.cfr.washington.edu/Acad/clubs.htm.

Of Special Note: Some college classes include field trips or require laboratory supplies or material duplication at student expense.

Graduate Programs

Graduate Program Coordinator
116 Anderson, Box 352100
206-543-7081
cfradv@u.washington.edu

Graduate programs in forest resources are designed to accommodate a wide range of education and career objectives. A student may concentrate on development of advanced professional skills and knowledge or on exploration of forest-related science.

Graduate programs offered in forest resources lead to the degrees of Master of Forestry, Master of Environmental Horticulture, Master of Science, and Doctor of Philosophy. Graduate students may center their graduate study in one of the special fields of study within the College divisions.

Master of Environmental Horticulture

Admission Requirements

- * Evidence of academic readiness for the program.
 - o Minimum GPA of 3.00 in last 60 semester or last 90 quarter hours.
 - o Type and level of courses completed (generally, students are not admitted if their academic performance has been below average or they do not have sufficient course background in their intended program of study).
 - o Scores on the GRE (550-Verbal, 600-Quantitative, 5.0 Writing recommended).
 - o International applicants only: Minimum TOEFL score of 580 (237 for computer based test).
- * Evidence of knowledge of the intended area of study.
 - o Clearly-written statement of objectives in pursuing further education.
 - o Work or field experience in the planned area of study.
 - o Publications written by the student related to the planned area of study.
- * Supporting evidence from reference persons.
 - o Recommendation from references familiar with applicant's academic ability and potential.
 - o Letters of recommendation from employers in field related to applicant's educational goals.

Degree Requirements

45 credits, as follows:

- * CFR 500 (1), CFR 503 (6), CFR 549 (2), CFR 561 (2), ESRM 411 (3), ESRM 451 (5), ESRM 480 (5), ESRM 481 (2); one course in policy, planning or administration (3 credits)
- * Internship/independent research: A formal public presentation and written professional paper are required. A member of the EHUF faculty will advise the student on his/her project, which will be completed as CFR 601 (9 credits minimum)
- * Electives (14 credits)

Master of Forestry

Admission Requirements

- * Evidence of academic readiness for the program.
 - o Minimum GPA of 3.00 in last 60 semester or last 90 quarter hours.
 - o Type and level of courses completed (generally, students are not admitted if their academic performance has been below average or they do not have sufficient course background in their intended program of study).
 - o Scores on the GRE (550-Verbal, 600-Quantitative, 5.0 Writing recommended).
 - o International applicants only: Minimum TOEFL score of 580 (237 for computer based test).
- * Evidence of knowledge of the intended area of study.
 - o Clearly-written statement of objectives in pursuing further education.
 - o Work or field experience in the planned area of study.

- o Publications written by the student related to the planned area of study.
- * Supporting evidence from reference persons.
 - o Recommendation from references familiar with applicant's academic ability and potential.
 - o Letters of recommendation from employers in field related to applicant's educational goals.

Degree Requirements

45 credits, as follows:

- * CFR 500 (1), CFR 509 (3), CFR 526 (3)
- * Directed electives: 24 credits distributed among the following four areas, with at least two classes required in each area: Forest biology/ecology, forest management, forest measurements, forest policy and administration. See adviser for list of approved courses for each area.
- * Unrestricted electives: 12 credits
- * Capstone project: CFR 600 (5) or CFR 601 (5)

Master of Science

Admission Requirements

- * Evidence of academic readiness for the program.
 - o Minimum GPA of 3.00 in last 60 semester or last 90 quarter hours.
 - o Type and level of courses completed (generally, students are not admitted if their academic performance has been below average or they do not have sufficient course background in their intended program of study).
 - o Scores on the GRE (550-Verbal, 600-Quantitative, 5.0 Writing recommended).
 - o International applicants only: Minimum TOEFL score of 580 (237 for computer based test).
- * Evidence of knowledge of the intended area of study.
 - o Clearly-written statement of objectives in pursuing further education.
 - o Work or field experience in the planned area of study.
 - o Publications written by the student related to the planned area of study.
- * Supporting evidence from reference persons.
 - o Recommendation from references familiar with applicant's academic ability and potential.
 - o Letters of recommendation from employers in field related to applicant's educational goals.

Degree Requirements

45 credits, as follows:

- * Orientation: CFR 500 (1)
- * Social and Natural Sciences Applied to Natural Resource and Environmental Issues: CFR 509 (3)
- * Disciplinary Knowledge: minimum 10 credits from list of approved courses according to interest area
- * Research Design and Quantitative Analysis: minimum 8 credits from list of approved courses according to interest area
- * Current Topics: 2 credits (500 level), topics vary from year to year
- * Thesis Research: CFR 700 (9 credits minimum)

Current interest groups are:

- * Environmental Horticulture and Urban Forestry
- * Forest Ecology
- * Forest Soils
- * Forest Systems and Bioenergy

- * Paper Science and Engineering
- * Restoration Ecology
- * Social Sciences
- * Sustainable Resource Management
- * Wildlife Science.

Doctor of Philosophy

Admission Requirements

- * Evidence of academic readiness for the program.
 - o Minimum GPA of 3.00 in last 60 semester or last 90 quarter hours.
 - o Type and level of courses completed (generally, students are not admitted if their academic performance has been below average or they do not have sufficient course background in their intended program of study).
 - o Scores on the GRE (550-Verbal, 600-Quantitative, 5.0 Writing recommended).
 - o International applicants only: Minimum TOEFL score of 580 (237 for computer based test).
- * Evidence of knowledge of the intended area of study.
 - o Clearly-written statement of objectives in pursuing further education.
 - o Work or field experience in the planned area of study.
 - o Publications written by the student related to the planned area of study.
- * Supporting evidence from reference persons.
 - o Recommendation from references familiar with applicant's academic ability and potential.
 - o Letters of recommendation from employers in field related to applicant's educational goals.

Degree Requirements

90 credits, as follows:

- * Same as for Master of Science degree (above) with one additional course in each of the categories:
 - o Disciplinary Knowledge
 - o Research Design and Quantitative Analysis
 - o Current Topics
- * Qualifying examination
- * General examination
- * Dissertation research: CFR 800 (27 credits minimum)
- * Final examination

Financial Assistance

The College has a limited number of appointments for teaching and research assistantships that provide a stipend, tuition waiver, and benefits. Teaching and research responsibilities are half-time, allowing time to pursue a full academic load. Students may contact faculty about research assistantships.

Fellowships without teaching or research obligations are also available. Requests for consideration must be submitted by January 15 for the following academic year. Applications are in the College's admissions packet which may be requested from the Office of Student and Academic Services.

Course Descriptions

See page 522.

The Information School

370 Mary Gates Hall
Box 352840

Dean
Harry Bruce

Associate Dean
Harry Bruce
Joseph Janes

The Information School is dedicated to preparing individuals for professional careers and leadership roles in the information professions. The School embraces a wide range of academic interests reflected in its main academic degree areas: information science, library science, information management, and informatics. Graduates of the School assume a variety of professional roles in the public and private sectors, with positions that span from information architects to children's librarians, from Web developers to information technology (IT) managers.

The signature of the School is its "human-centered" approach to information studies and technology. This focus holds the human perspective as a critical and integral component in the study of information and technology; it encourages increasing understanding of human involvement with information and its social and technological ramifications.

Through its specific goals and objectives in instruction, research, service, and outreach, the School creates and continues to foster a dynamic learning environment dedicated to preparing its students for emerging opportunities and challenges of the twenty-first century.

The School offers four degree programs leading to the Bachelor of Science in Informatics, the Master of Library and Information Science (MLIS), the Master of Science in Information Management (MSIM), and the Doctor of Philosophy in Information Science. The School also provides certificate programs, continuing education opportunities for professionals as well as service courses for undergraduates in information fluency, research strategies, and technology.

History

Originally established in 1911, the Information School has the oldest library and information program west of the Mississippi, and continues to offer the most extensive American Library Association-accredited library and information science degree in the Northwest region of the United States.

In 1998, the University set out to transform the School by charging it with a new mission, to become what it is today: a broad-based information school that meets the challenges and opportunities of the information age. With the addition of three new degree programs, a new dean, an esteemed faculty, and state of the art facilities, the Information School became the University's sixteenth independently organized school/college in 2001.

The School seeks to explore the theoretical and applied cutting edges of the information field and to nurture the best of both worlds: traditional library values and ever-changing information frontiers.

The vision statement adopted by the School is "People and Knowledge: Building Information Connections. The faculty, staff, students and alumni of the Information School believe that connecting people with knowledge is of fundamental individual and societal importance; further, we believe access to information is a basic human right. We commit ourselves to sustain this vision."

Undergraduate Program

Informatics refers to the study of information systems and technology from a human perspective. It features the Information School's emphasis on a human-centered approach to systems design.

Informatics students study a range of information constructs, from simple systems that support personal information management to complex systems that involve vast databases of distributed information manipulated in real-time by high-speed computer technologies. They analyze national and global information policy, the management of formal information systems in organizations, and the subtleties of everyday information behavior. Also, they invent methods for representing, classifying, and retrieving information and design new information systems responsive to people's needs and values.

Adviser
470 Mary Gates Hall
Box 352840
206-543-1794
informatics@ischool.washington.edu

Bachelor of Science

Suggested First- and Second-Year College Courses: INFO 100, an English composition course (selected from the University list), CSE 142, CSE 143, and STAT 311, courses that develop strong analytical, qualitative and quantitative reasoning, and written and oral communication skills as well as courses that provide exposure to a variety of social science fields.

Program Admission Requirements

Regular Admission

1. INFO 100 (5 credits), CSE 142 (4) and CSE 143 (5), STAT 311 (5); one English composition course selected from the University list (5), with a minimum grade of 2.0 in each course. Departmentally approved transfer equivalents may be used to substitute for prerequisite courses. (Students may not receive credit for INFO 100 taken after CSE 142. Therefore, INFO 100 will be waived for students who have already completed CSE 142 or equivalent. If INFO 100 is waived, students make up the 5 credits by taking additional elective credits in the major.)
2. Minimum 2.00 cumulative college GPA.
3. Admission is competitive, based on the following criteria:
 - a. Overall academic performance
 - b. Grades in courses required for admission to the major
 - c. Personal statement reflecting an interest in and commitment to becoming a major in this field
 - d. Other evidence of interest and commitment to the field (e.g., work experience, internships).
4. Application deadline is April 15. Students apply online at www.ischool.washington.edu between February 1 and April 15. Admission is for autumn quarter only.
5. Transfer students should contact the Information School as soon as they become interested in the informatics major. The School will consider courses equivalent to CSE 143 and may allow a student to be admitted provisionally on the condition that the student completes CSE 143 or equivalent with a minimum grade of 2.0 during the summer before matriculating in the program.

Meeting the above criteria does not guarantee admission.

Freshman Direct Admission Program (FDAP)

1. Designed to recruit top high school students to the program and to the UW. Students who indicate an interest in the Informatics program are automatically considered for FDAP participation upon application to the UW. They are evaluated based on careful review of qualitative and quantitative factors, including high school GPA, SAT scores, personal statement, and any additional information provided in their application file. Students selected for FDAP are involved in the academic and social life of the Information School, participating in courses, activities, and research opportunities as appropriate during their freshman and sophomore years.
2. The number of early admission (FDAP) students will not exceed 10% of the number of majors admitted each year.

Major Requirements

92 credits as follows:

1. Courses required for admission to the program (24 credits, as shown above)
2. Human Centered Strand (20 credits): INFO 310, INFO 311, INFO 320, and INFO 380
3. Technical Strand (13 credits): CSE 373, INFO 340, and INFO 341
4. Integrated Strand (23 credits): INFO 300, INFO 370, INFO 440, and INFO 490 or INFO 491
5. Major Electives (12 credits minimum) selected from upper-division electives from the Information School and approved courses from outside departments.

General Education: Beyond the 92 credits required for the major, students must also satisfy the following:

- * English composition (5 credits)
- * Quantitative/Symbolic Reasoning (5 credits)
- * Writing courses (10 credits)
- * Natural World (20 credits)
- * Individuals & Societies (20 credits)
- * Visual, Literary, & Performing Arts (20 credits)

With courses required for the major, students automatically satisfy requirements for English composition (pre-admission English composition requirement), Quantitative/Symbolic Reasoning (STAT 311), Writing (INFO 310, INFO 311, and INFO 320), and Natural World (CSE 142, CSE 143, and INFO 340, INFO 341, and INFO 440). In addition, students satisfy a good portion of the requirements for Individuals & Societies (INFO 310, INFO 311, and possible electives). They satisfy requirements for Visual, Literary, and Performing Arts by taking courses outside the major. (INFO 424, an elective in the major, also counts towards the VLPA requirement.) Students must earn a minimum 180 credits to graduate.

Continuation Policy

Students are expected to make satisfactory progress towards attainment of the Bachelor of Science in Informatics degree. Under normal circumstances, an informatics major attending full-time would make satisfactory progress by completing the major requirements in approximately two years after admission to the major, or within three years for students admitted to the major as sophomores. Lack of academic progress may be evidenced by low scholarship as well as excessive course repeats, course drops, or University withdrawals and cancellations. For more details, see adviser.

Student Outcomes

- * **Learning Objectives and Expected Outcomes:** The Informatics program prepares students for a wide range of endeavors in the information field including information management and technology, research and information services, interactive system design, human-computer interaction, and information science.

Graduates of the Informatics program are qualified for jobs in the information and technology industry and in business, public service, and other various professions. Possible job titles include security and performance analyst, web developer, information management specialist, network administrator, product developer, business analyst, usability engineers, and many others.

The program also provides strong preparation for graduate studies. Graduates are successfully placed in prestigious graduate schools and pursue a variety of programs, including information and management science, information science, biomedical informatics, business and accounting, and information technology.

Informatics student learning outcomes include the ability to assess people's information needs and behavior; ability to design information systems to meet people's information needs; ability to work with information technologies (e.g., database, networks, Internet-based, interface design); ability to evaluate the impact of information technologies on people; ability to communicate effectively in writing and speaking; ability to work effectively individually and as part of a team; and ability to understand the research process and its implication for information systems design and use. All Informatics courses are designed to produce these outcomes through a rigorous experiential learning approach that emphasizes group work, research, writing, oral presentations, and technology.

- * **Instructional and Research Facilities:** Located on the third and fourth floors of Mary Gates Hall, the School offers an extensive software collection, a state-of-the-art computer classroom, an innovative Technology Exploration (TE) Lab, and excellent network connectivity. Students have access to software applications including titles for database and text management, programming, graphics, web page creation, Internet exploration and collaboration, and office productivity. Students also have access to a large number of bibliographic databases and commercial information services. The TE Lab is a unique facility that includes twenty-four student stations and thirty-two servers on a "server wall." The lab is designed to promote exploration of a variety of technologies. Students can install alternative operating systems, set up their own file, Web, or database server, and become the system administrator of their machines.

To promote strong academic and professional writing skills, the School hosts the Engineering iSchool Writing Center (EiWC) in collaboration with the College of Engineering.

The School also has a dedicated information science research facility at the Roosevelt Commons Building. The research space comprises 10,000 square feet of offices, workstations, research labs, and meeting spaces.

- * **Honors Options Available:** With College Honors; With Distinction (Departmental Honors). See adviser for requirements.
- * **Research, Internships, and Service Learning:** Internships are encouraged, but not required. Students participate in a variety of internships, paid and non-paid. A significant number of students also work part-time in Informatics or technology-related positions, and participate in public service.
- Informatics students are extensively engaged in faculty research and internships. Over half of all informatics students participate in the University's Undergraduate Research Symposium each year. Students have co-authored publications with faculty, had their research accepted for presentation at national conference poster sessions, and been recognized with various awards, including the Mary Gates Research Training Endowment for three consecutive years (2001-03).
- * **Departmental Scholarships:** The Henry Scholarships, in the amount of approximately \$1500 each, are awarded to three second-year majors in recognition for academic achievement, leadership, and service to the School and in professional/student activities. Students to be considered for the award are nominated by the Information School faculty and Undergraduate Program Committee members. The merit-based awards, named after the founder of the school and first director, William Henry, are intended to recognize and honor student achievement.

- * **Student Organizations/Associations:** Undergraduates participate in a number of the School's many student organizations, including the UW Informatics Undergraduate Association (IUGA) and the student chapter of the American Society of Information Scientists and Technology (ASIST).

Of Special Note:

Capstone Projects: Students often use their capstone projects to identify interest areas, develop skills, and prepare for future pursuits. The capstone projects, with titles such as "Making Environmental Policy: Human Centered Analysis of Knowledge Sharing Between Cross-Functional Groups" and "Project Management in an Open Source Developing Community," encompass a wide range of topics. Through capstone projects, students demonstrate the skills, understandings, and competencies they can successfully use to prepare for employment and graduate studies.

Information Sessions: Prospective students are encouraged to attend an Informatics information session. For a schedule of information sessions, visit the Web at www.ischool.washington.edu/informatics/infosessions.htm.

Graduate Programs

Graduate Program Coordinator
370 Mary Gates Hall, Box 352840
206-543-1794
info@ischool.washington.edu

The School offers graduate programs leading to the Master of Library and Information Science (M.L.I.S.), the Master of Science in Information Management (M.S.I.M.), and the Doctor of Philosophy in Information Science.

Master of Library and Information Science

Admission Requirements

Note that the MLIS program is offered in two delivery modes: residential (on-campus, 2 year program) and distance (online with quarterly residencies, 3 year program). When applying applicants must indicate for which program they are applying.

- * Work experience related to the library and information professions, including employer, position title, and dates of employment. List other types of employment experience

- * Involvement with volunteer, community, and/or diversity-related activities, including the organization, position title, and dates of service
- * Relevant honors, awards, publications, and presentations
- * Three letters of recommendation
- * Personal statement of educational and professional goals (500-750 words)
- * Official transcript from each relevant institution attended
- * GRE Scores. Applicants with an earned doctorate (Ph.D., M.D., J.D.) are not required to submit GRE scores.
- * TOEFL score (for international students)
- * Signed paper copy of UW Graduate School application

Degree Requirements

63 credits, as follows:

- * Core curriculum (34 credits): LIS 500 The Life Cycle of Information (2), LIS 510 (4), LIS 520 (4), LIS 530 (4), LIS 540 (5), LIS 550 (4), LIS 560 (3), LIS 570 (4), LIS 580 (4)
- * Electives (29 credits)
- * Portfolio or Thesis Option: MLIS students must complete either a portfolio or thesis in order to graduate.
- * Directed Fieldwork: LIS 590 (2-4, max. 8) is an elective course designed to provide students with an opportunity to work in an information environment under the supervision of an experienced professional mentor.

Master of Library and Information Science, Law Librarianship

The Law M.L.I.S. program is designed to prepare lawyers with an existing JD degree to serve as law librarians in courts, federal and state units of government, law schools, corporations, and law firms.

Admission Requirements

- * Work experience related to the library and information professions, including employer, position title, and dates of employment. List other types of employment experience
- * Involvement with volunteer, community, and/or diversity-related activities, including the organization, position title, and dates of service
- * Relevant honors, awards, publications, and presentations
- * Three letters of recommendation
- * Personal statement of educational and professional goals (500-750 words)
- * Official transcript from each relevant institution attended
- * GRE Scores. Applicants with an earned doctorate (Ph.D., M.D., J.D.) are not required to submit GRE scores.
- * TOEFL score (for international students)
- * Signed paper copy of UW Graduate School application

Degree Requirements

44 credits, as follows:

- * Core curriculum (23 credits): LIS 500 (2), LIS 510 (4), LIS 520 (4), LIS 530 (4), LIS 540 (5), LIS 550 (4)
- * Law librarianship courses (17 credits): LIS 591 (3), LIS 592 (3), LIS 593 (3), LIS 594 (4), LIS 595 (4)
- * Directed fieldwork: LIS 590 (4)

Master of Science in Information Management

Admission Requirements

- * Work experience related to the library and information professions, including employer, position title, and dates of employment. List other types of employment experience
- * Involvement with volunteer, community, and/or diversity-related activities, including the organization, position title, and dates of service
- * Relevant honors, awards, publications, and presentations
- * Three letters of recommendation
- * Personal statement of educational and professional goals (500-750 words)
- * Official transcript from each relevant institution attended
- * GRE Scores. Applicants with an earned doctorate (Ph.D., M.D., J.D.) are not required to submit GRE scores.
- * TOEFL score (for international students)
- * Signed paper copy of UW Graduate School application

Degree Requirements, Day Option

65-71 credits, as follows:

- * Core curriculum:
 - o Foundational core courses: IMT 480 (4), IMT 440 (1-5, max. 5), IMT 500 (1)
 - o Technology core courses: IMT 540 (4), IMT 541 (5), IMT 542 (3)
 - o Management core courses: IMT 580 (4), IMT 581 (3), IMT 582 (4)
 - o Integrating core courses: IMT 598 (3), IMT 595 (3-5)
- * Electives (24 credits): Beyond the required core courses, students have the option of crafting a program of study, in collaboration with their faculty adviser, specific to their interests and career goals. MSIM course electives include, among others, principles of information retrieval systems, strategic planning and evaluation, and marketing foundations for information professionals.
- * Internship: MSIM internships are structured around a course (IMT 590) and are designed to provide students with an opportunity to work in an information environment under the supervision of an experienced professional mentor. During the internship placement (lasting a minimum of two academic quarters), the student works to meet meaningful learning objectives that have been mutually defined by student and internship supervisor.

Degree Requirements, Executive Option

47-53 credits, as follows:

- * Core curriculum:
 - o Foundational core courses: IMT 480 (4), IMT 440 (1-5, max. 5), IMT 500 (1)
 - o Technology core courses: IMT 540 (4), IMT 541 (5), IMT 542 (3)
 - o Management core courses: IMT 580 (4), IMT 581 (3), IMT 582 (4)
 - o Integrating core courses: IMT 598 (3), IMT 595 (3-5)
- * Electives: Students complete a minimum of 11 credits of electives, which includes advanced M.S.I.M. courses, relevant upper level coursework in other academic disciplines, or an Independent Study (IMT 600).

Doctor of Philosophy in Information Science

Professor Wanda Pratt
370 Mary Gates Hall
206-543-1794
phd@i.school.washington.edu

Admission Requirements

- * Work experience related to the library and information professions, including employer, position title, and dates of employment. List other types of employment experience
- * Involvement with volunteer, community, and/or diversity-related activities, including the organization, position title, and dates of service
- * Relevant honors, awards, publications, and presentations
- * Three letters of recommendation
- * Personal statement of educational and professional goals (500-750 words)
- * Official transcript from each relevant institution attended
- * GRE Scores. Applicants with an earned doctorate (Ph.D., M.D., J.D.) are not required to submit GRE scores.
- * TOEFL score (for international students)
- * Signed paper copy of UW Graduate School application

Degree Requirements

90 credits minimum, as follows:

- * Required courses: INSC 501 (3), INSC 570 (4), INSC 572 (5), INSC 500 (2); two research practica; two teaching practica; at least one of the following quantitative methods courses: BOST 502 (4), BOST 517 (4), COM 520 (5), CS&SS 507 (3), PSYCH 524 (4)
- * Additional elective coursework selected in consultation with the faculty advisers
- * 18 graded credits in courses at the 500 level and above (taken prior to General Exam)
- * 60 credits taken prior to General Exam
- * 27 dissertation credits (INSC 800)
- * Preliminary Review determined by a School-based Advisory Committee at the end of the required first-year of full-time study

- * General Examination upon completion of coursework and practica components to attain formal candidacy for the Ph.D. program (Candidate's Certificate)
- * Successfully defend a dissertation before a Supervisory Committee (Final Examination)

Financial Aid

The University of Washington Financial Aid Office administers a variety of government and University funded financial aid programs for which applicants must submit the Free Application for Federal Aid form (FAFSA). For more information, contact the UW Financial Aid Office, 105 Schmitz Hall. Information on the FAFSA is also available online.

Graduate Assistantships and Scholarships

Financial aid options for full-time students may include graduate assistantships and scholarships. Graduate assistants generally work 220 hours per quarter, and receive a tuition waiver as well as a monthly salary and medical benefits. To apply for a M.L.I.S. Graduate Assistantship, prospective students should complete the application form at www.ischool.washington.edu/resources/finaid/mlis.aspx and submit the form with their resume to the Assistant to the Associate Dean for Academics by February 1. Ph.D. students are automatically considered for graduate student service appointments.

M.L.I.S. scholarships are awarded on a basis of financial need, based on information from the Free Application for Federal Student Aid (FAFSA), and academic merit.

Information regarding additional sources of financial aid, from sources outside the Information School, is available at the Information School Financial Aid Resources Web page.

Special Research Facilities

Located on the third and fourth floors of Mary Gates Hall, one of the University's flagship high-technology buildings, the School offers an extensive software collection, a state-of-the-art computer classroom, an innovative Technology Exploration (TE) Lab, and excellent network connectivity. Students have access to software applications including titles for database and text management, programming, graphics, Web page

creation, Internet exploration and collaboration, and office productivity. Students also have access to a large number of bibliographic databases and commercial information services.

The TE Lab is a unique facility that includes twenty-four student stations and thirty-two servers on a "server wall." The lab is designed to promote exploration of a variety of technologies. Students can install alternative operating systems such as Linux, setup their own file, Web, or database server, and become the system administrator of their machines. Each machine includes a removable hard drive so that students can use either a "production setup" with all software previously installed and configured, or an "experimental setup" where students are free largely to do as they desire.

To promote strong academic and professional writing skills, the School hosts the Engineering iSchool Writing Center (EiWC) in collaboration with the College of Engineering, as a resource for students.

The School also has a dedicated information science research facility at the Roosevelt Commons Building. The research space comprises 10,000 square feet of offices, workstations, research labs, and meeting spaces.

For more information, please visit the School's Web site at www.ischool.washington.edu/technology/.

Continuing and Professional Education

The Information School works with University of Washington Educational Outreach to offer classes, workshops, and certificate programs for continuing education and professional development. Current certificate programs include Web Technology Essentials, Data Resource Management, Electronic Information and Records Management; Web Administration, and Small Business Web Master. Those interested in continuing education or certificate programs should contact UW Educational Outreach, 4311 11th Avenue NE, Box 354978, University of Washington, Seattle, WA 98105. Phone: 206-543-2320 or see www.extension.washington.edu/ext/.

Course Descriptions

See page 528.

Interdisciplinary Graduate Degree Programs

Astrobiology

C319 Physics-Astronomy Building

Astrobiology -- the study of life in the universe -- investigates the wide range of multidisciplinary factors that may influence the origin and evolution of life on Earth and beyond.

This investigation demands an intense interdisciplinarity, and the Astrobiology Program at the University of Washington is creating a new community of scholars, investigators, and educators. This community is skilled in multidisciplinary methods and thinking and pushes the boundaries beyond the commonplace with intellectual vigor, creativity, and rigorous method.

Astrobiology at the University of Washington builds on the strengths of traditional academic structure to transcend the limits of specialization through the synergy of multidisciplinary cooperation in both research and education.

The internationally recognized graduate certificate program offers a rigorous, interdisciplinary curriculum in cooperation with the Ph.D. programs of the participating departments. The program's unique features that bond students and faculty from widely disparate departments. Participating graduate students gain the personal and professional skills necessary to successfully engage in multidisciplinary collaborations.

The emerging field of astrobiology benefits from and is shaped by the perspectives of multiple disciplines directed at a common problem. So, too, does the astrobiology community of scholars and researchers at the University of Washington benefit from the breadth of perspective offered by diversity in culture and race among the program's participants.

Graduate Program

Graduate Program Coordinator
C304 Physics-Astronomy, Box 351580
206-685-2392
office@astro.washington.edu

Graduate Certificate Program

Admission Requirements

The University of Washington academic departments participating in the Graduate Certificate Program in Astrobiology provide expertise in all the primary disciplines collaborating in the study of Astrobiology:

- * Aeronautics and Astronautics
- * Astronomy
- * Atmospheric Sciences
- * Biochemistry
- * Biology
- * Genome Sciences
- * Earth and Space Sciences
- * History (of Science)
- * Microbiology
- * Oceanography

Students wishing to participate in the Astrobiology Graduate Certificate Program must be accepted for admission in the usual way by the Ph.D. program of one of these departments.

Please contact the participating departments of your choice for Ph.D. program application requirements and deadlines.

Certificate Requirements

15 credits minimum, as follows:

- * ASTBIO 501 (4)
- * ASTBIO 502 (4)
- * Three astrobiology-only seminar series (1 cr)
- * One cognate course approved by the student's advisory committee to ensure sufficient breadth (see program Web site for current list of cognate courses)

- * One quarter of a research rotation in an area outside the student's home discipline (3 to 10 credits)
- * Participation in a minimum of three workshops comprising the capstone experience (non-credit)
- * Astrobiology ethics seminar (variable credits)

A minimum of 15 credits are required. Additional credits may be earned through:

- * Other approved cognate courses
- * Astrobiology public lecture series (1 credit)

Successful completion of the program requires a minimum cumulative GPA of 3.00 for all courses required for the certificate and a grade of 2.7 or higher for each elective course counted toward the certificate.

Course Descriptions

See page 301.

Biomedical Structure and Design

J405 Health Sciences

Graduate Program

Graduate Program Coordinator
G514 Health Sciences, Box 357420
206-543-5474

The department's graduate program is directed toward the education of doctoral students who anticipate careers that will involve teaching or research in the biomedical sciences. Graduates from the program have a broad knowledge of biological structure at all levels, from the molecular to the human anatomical, with a major emphasis on the cellular level.

Graduate students select research and teaching options in their program. The research options are designed to provide training for a student in one or two of the following areas: cell and developmental biology, neurobiology, quantitative biology, cellular immunology, molecular biology, and macromolecular structure. Teaching options prepare the student to teach in one of the anatomical subdisciplines: human anatomy, neuroanatomy/neurobiology, histology, embryology/developmental biology, cell biology, and macromolecular structure.

Master of Science

Admission Requirements

- * A minimum GPA of 3.00
- * A bachelor's degree in one of the following or a related area: chemistry, biology, physics, biochemistry, or biophysics.
- * GRE and advanced GRE in either Chemistry, Biochemistry, Biology or Physics.
- * The minimal course requirements for successful applicants are:
 - o Chemistry: general, organic, and physical
 - o Physics: one year
 - o Mathematics: one year of calculus; multivariable calculus and/or linear algebra are strongly recommended
 - o Biology and/or Biochemistry: one year general biology plus one advanced course in biology or biochemistry
- * Undergraduate research experience is strongly recommended.
- * International students must have a minimum TOEFL score of 600.
- * International students hoping to study with BMSD faculty in the Chemistry Department must have a minimum TSE score of 55.

Degree Requirements

36 credits, as follows:

- * Required courses: BIOC 530 (3); BMSD 540, BMSD 541, BMSD 542 (2, 2, 2); BMSD 520 (0.5) to be taken every quarter
- * 12 graded credits of elective courses covering at least three of the four BMSD categories of topics: Biomolecular Structure, Techniques in

- Biomolecular Structure, Molecular and Cellular Biology, and Chemistry
- * At least one sequence of Biomedical Research Integrity workshops in the first or second year of the program. The Biomedical Research Integrity (BRI) Series is a sequence of lectures and workshops offered during summer quarter each year.
 - * Teaching: In order to gain practical teaching experience, students in the program will serve as teaching assistants for two quarters.
 - * Research: Students rotate through a minimum of two and a maximum of three participating laboratories during their first year. The opportunity exists for students to do an early rotation during summer quarter.

Course Descriptions

See page 534.

Biology Teaching

Graduate Program Coordinator
222 Hitchcock, Box 355320
206-543-1689

The Graduate School Biology Teaching Group offers an interdisciplinary program that leads to the degree of Master of Science in biology for teachers. Although designed specifically for biology teachers in K-12 schools and community colleges, other life science educators, such as those in environmental learning centers, may find the program especially worthwhile. The program emphasizes broadening the student's understanding of the various fields of biological science, with the improvement of the student's effectiveness as a teacher as the primary goal. Opportunities for course work within the departments of the University in biological science and science education are provided. Each student is asked to perform an in-depth study of a biological science problem in the context of its relevance to the teaching of biological science. Facilities and guidance are provided by a sponsoring professor and advisory committee drawn from the Biology Teaching Group and the several biological science departments of the University.

Master of Science

Admission Requirements

- * Secondary teaching certificate. (Uncertified teachers employed in private schools, community colleges, or other educational facilities must provide evidence of professional involvement in teaching.)
- * Bachelor's degree in biology or closely related field. Students in related fields must have adequate preparation in science.
- * Minimum GPA of 3.00 in the most recent 90 graded quarter credits (60 semester credits)
- * Graduate Record Examination Test scores Two or three letters of recommendation.
- * Statement of professional experience and objectives.

Degree Requirements

- * 36 credits, 18 of which must be graduate level and 18 must be graded. These categories are not mutually exclusive.
- * All coursework must be at or above the 400 level.
- * Each student plans a program to meet his or her own educational objectives, selecting at least one course from each of the following areas: botany, genetics, microbiology, zoology, and from the College of Education. One course in biochemistry is also required unless already completed in prior academic work. Courses in biomedical history, fisheries, forest resources, environmental studies, etc. may be appropriate for the student's interests. The Graduate Program Coordinator assists the student in this planning.

Environmental Management

274 Mary Gates Hall

The graduate certificate in environmental management (EM) is an interdisciplinary program designed to prepare students to contribute to sustainable utilization and enhancement of the natural and human environment. Through coursework, seminars, and a capstone consulting project, students acquire the tools to solve real-world environmental problems via the three avenues of science, policy, and business. The

program provides an excellent education and training opportunity for a diverse array of graduate students preparing for careers in the broad field of environmental affairs.

Key benefits of the program are:

- * Students participate in a community of faculty and students from a multitude of departments who share the common goal of environmental stewardship and sustainability.
- * Students explore environmental problems, and develop solutions, in a multidisciplinary environment, incorporating a wide range of perspectives and priorities.
- * Students receive a printed certificate and record in their transcript from the Graduate School to document completion of the interdisciplinary program in Environmental Management.

The flexible curriculum is suitable for students from many backgrounds, such as engineering, physical and natural sciences, public policy, economics, geography, public health, and political science, to name a few.

There is no other such interdisciplinary educational experience available to graduate students at the University of Washington at this time.

Eligibility

All students enrolled in graduate and professional degree programs in any school of the University of Washington are eligible to apply.

Prior to admission, students must have completed a one-quarter upper-level or graduate-level course in applied quantitative methods (e.g., microeconomics, numerical modeling, applied statistical methods) or pure quantitative methods (e.g., mathematics or statistics); and social or natural science.

Facility with written argument and communication is a prerequisite. This requirement is demonstrated in the letter of application.

Steering Committee

The program is governed by the Steering Committee for Environmental Management.

Graduate Program

Graduate Program Coordinator
274 Mary Gates Hall
Box 352802
206-221-6129
envirmgt@u.washington.edu

The certificate's courses and projects have been chosen to prepare students to contribute legal, scientific, social science, and technical expertise to environmental decision making at the local, national, and international scales. Students are required to broaden their knowledge and skills base beyond their home discipline; to read material from other fields with critical facility; to understand and appreciate the goals and analysis methods common to other fields; and, perhaps most importantly, to appreciate, communicate with, and collaborate with experts from other fields, who have different perspectives and priorities.

Certificate Requirements

21 credits, as follows:

- * Three core courses (10 total credits, actual courses vary by year)
- * Completion of a team-based keystone project (ENVIR 491, 8 credits)
- * participation in the Henry Luce Environmental Management speaker series (included with keystone credits)
- * 3 credits of electives selected in consultation with the Graduate Program Coordinator and approved by the EM Admissions Committee

Global Trade, Transportation, and Logistics Studies

313 Loew

The aim of the graduate certificate program in Global Trade, Transportation, and Logistics (GTTL) is to enable graduate students to augment their degree programs in preparation for careers that demand the combined knowledge of trade, transportation, and logistics. Particular attention is directed to the study of activities involved in the flow of goods from point of origin to point of consumption on a global scale. The wide range of issues addressed include the management of the intermodal connections among maritime, aviation, and overland modes of transport; environmental and energy concerns; advancements in telecommunications; and the legal, regulatory, and technological infrastructures that facilitate global commerce and transportation.

The GTTL graduate certificate program is responsive to the needs of government and industry for trained university graduates. The program is overseen by the Interdisciplinary Committee on Global Trade, Transportation, and Logistics. Members come from the University and the private and public sectors. GTTL works with leaders in business and government organizations to develop internships and jobs, in addition to offering a number of scholarship opportunities for graduate students. The GTTL certificate is based on a set of course requirements to be fulfilled in conjunction with the student's existing graduate degree program. Interdisciplinary Committee

The Interdisciplinary Committee periodically reviews the content of the core courses, recommends instructors, maintains the list of eligible electives, and coordinates with course instructors regarding scheduling and prerequisites. The committee is assisted in these tasks by the lead core-course instructor, the program director, the program assistant director, and the Graduate School staff, as appropriate. The committee also oversees the policy on admission to the graduate certificate program.

Graduate Program

Graduate Program Coordinator
313 Loew, Box 352193
206-616-5778
gttl@u.washington.edu

Students associated with GTTL receive the Graduate Certificate upon completing the program's requirements and obtain their degrees through cooperating academic units. Students admitted into graduate degree programs in the following units are eligible for the GTTL graduate certificate: Aeronautics and Astronautics, Business Administration, Civil and Environmental Engineering, Communications, Economics, Education, Forest Resources, Geography, International Studies, Law, Marine Affairs, Political Science, Public Affairs, Technical Communication, and Urban Design and Planning. Graduate students from other departments may be admitted on an ad hoc basis. GTTL prepares students for careers in international trade, transportation, and logistics by offering a comprehensive program encompassing selected courses from the aforementioned separate disciplines. Those students completing the graduate certificate receive an appropriate notation on their transcript and a Letter of Achievement, signed by the head of the student's academic unit and the Dean of the Graduate School.

Certificate Requirements

The requirements consist of a minimum of 20 credits: two core courses (8 credits) and four elective courses (at least 12 credits).

The core courses -- GTTL 501 and 502 -- provide a basic overview of the academic theories, political-economic structures, industrial dynamics, public policies, and strategic issues concerning the study, business, and regulation of global trade, transportation, and logistics.

Students select electives from a continually updated list. Most electives (and core courses) may also satisfy a student's home department requirements. At least one elective must come from outside the home department to reinforce the interdisciplinary objective of the certificate program. A substitution policy developed by the committee assures that an appropriate mix of electives can be found for each student. GTTL 600 (Independent Study) and GTTL 601 (Internship) provide an alternative means to gain elective credits.

Course Descriptions

See page 534.

Health Services Administration

Graduate Program Coordinator -- In-Residence and Executive Programs
H660 Health Sciences, Box 357660
206-543-8778
mhap@u.washington.edu

The Health Services Administration Group offers two programs of study leading to the Master of Health Administration (M.H.A.) degree: an in-residence program and an executive program. The M.H.A. degree is fully accredited by the Accrediting Commission for Education in Health Services Administration. It provides the educational foundation for careers in management, planning, consulting and policy-making in ambulatory care organizations, hospitals, long-term care facilities, mental health care organizations, government agencies, planning agencies, and other organizational settings in the health field. The curriculum is designed to be interdisciplinary with a faculty drawn from the Graduate Schools of Public Health and Community Medicine, Business Administration, Public Affairs, Nursing, Medicine, and Law. Concentrations of study may vary according to the student's academic interests and career objectives. In addition to academic work, in-residence M.H.A. students are strongly encouraged to participate in an internship experience in a health facility or agency typically under the preceptorship of the administrator or director of that organization.

Concurrent degree programs combining health administration with business administration, medicine, nursing, or public administration are also offered. These curricula (with the exception of the M.H.A./M.D.) typically require three years of intensive academic study and culminate in joint degrees (M.H.A./M.B.A., M.H.A./M.D., M.H.A./M.N., M.H.A./M.P.A.).

The Executive Master of Health Administration program, launched in January 1998, is designed primarily for mid-career physicians and other clinical practitioners, as well as experienced health services managers, who have demonstrated interest or competency in administration or management. It offers advanced curriculum in planning, organizing, and implementing programs that improve the cost-effectiveness and quality of patient care. Courses meet once each month for three-day sessions (typically Thursday through Saturday) for 24 months (October to September). This program structure allows practicing professionals to continue their careers while gaining a graduate degree.

Course listings may be found under the School of Public Health and Community Medicine, Department of Health Services section of this catalog.

Special Requirements

Applicants to the in-residence program must submit, in addition to Graduate School admission requirements, a narrative statement of objectives, a resume, three letters of recommendation, and scores from either the GRE or the GMAT. Informational interviews with members of the program faculty may be requested but are not part of the formal admission review process. Relevant health services experience is preferred. Applicants are accepted only for autumn quarter of each year. The application deadline is January 15. Applications received after this date (U.S. and Canadian only) will be considered on a space-available basis.

Applicants to the executive program must submit, in addition to Graduate School admission requirements, a narrative statement of objectives, a resume, three letters of recommendation, and either GRE or GMAT scores (excluding applicants with doctoral-level degrees from U.S.-accredited institutions). Priority of admission is given to applicants with medical/clinical training and professional experience. Applicants are accepted only for autumn quarter of each year. Applications are reviewed following the preferred deadline of April 30. Applications received after this date (U.S. and Canadian only) are reviewed on a space-available basis.

Applicants can expect to hear about the status of their application within four to six weeks of submission. Those interested in applying should contact the program office as soon as possible to inquire about availability and the application process.

Earlier application deadlines and additional documentation are required for international applicants.

Financial Aid

Financial support for current M.H.A. students may be available from several areas: loans, work study positions, internships, possible outside fellowships, and possible teaching or research assistantships outside the program. For more information on financial aid, contact the UW Office of Student Financial Aid (105 Schmitz Hall, Box 355880, 206-543-6101, osfa@u.washington.edu) or the M.H.A. program office. Research Facilities

In addition to its University facilities, the program makes extensive use of community health facilities and agencies for research and training.

Molecular and Cellular Biology

Graduate Program

Graduate Program Coordinator
T466 Health Sciences, Box 357275
206-543-0253
mcb@u.washington.edu

The Molecular and Cellular Biology Program (MCB) is a leader in applying the techniques of molecular and cellular biology to advance the understanding of basic biological sciences. The goal of the doctoral program is to broadly train students to think about science in a rigorous and critical manner. Since scientific methods, equipment, and knowledge are changing rapidly, students learn to focus on important issues in an evolving research environment. This program is appropriate for students interested in future careers in research and teaching in academia as well as biotechnology and pharmaceutical companies.

Thirteen departments across three schools have faculty members actively pursuing research in molecular and cellular biology. The departments participating in the program include Biochemistry, Bioengineering, Biological Structure, Biology, Environmental Health, Genome Sciences, Immunology, Microbiology, Pathobiology, Pathology, Pharmacology, and Physiology and Biophysics.

At the Fred Hutchinson Cancer Research Center (FHCRC), the divisions of Basic Sciences and Molecular Medicine participate in the joint Molecular and Cellular Biology graduate program. Shared FHCRC facilities are available for electron microscopy, flow cytometry, tissue culture, and image analysis. A biotechnology center for DNA and protein synthesis and sequencing, animal facilities, a biological production facility that focuses on monoclonal antibody production, extensive libraries, and a biocomputing center provide further support for the research effort.

Faculty Interests

Over 160 faculty members from the UW and FHCRC are researching molecular and cellular biology and are skilled in the training of graduate students. Faculty research interests encompass both prokaryotic and eukaryotic cells in the following general areas: genetics, cell biology, neurobiology, immunology, virology, molecular structure, developmental biology, cancer biology, plant biology, genomics/proteomics, and microbiology.

Doctor of Philosophy

Admission Requirements

- * Applicants must have completed a baccalaureate or advanced degree by the time of matriculation; degrees emphasizing biology, physical or natural sciences, and mathematics are preferred.
- * GRE scores. General Test. A Subject Test (e.g., Biology, Biochemistry, Chemistry) is not required but highly recommended.
- * Letters of recommendation
- * Statement of purpose

Degree Requirements

90 credits, as follows:

- * *Credit Requirements:* MCB students complete 21 graded credits of coursework with 9 credits of the CONJ series and 12 credits of graded elective courses. M.S.T.P. students receiving a Ph.D. through the MCB

Program are required to have 18 graded credits, and should petition the MCB directors to accept medical school courses in lieu of the remaining 3 credits.

- * *First Year:* Students complete most of their formal course requirements, select a permanent adviser, and establish a Doctoral Supervisory Committee. A typical first-year class schedule includes six five-week modules of the MCB conjoint series, three lab rotations, three quarters of literature review and one or more graded elective classes. Following the third rotation, students generally choose a permanent adviser in whose lab they will pursue research for the rest of their educational career, generally three to four years. During the summer, students complete the Biomedical Research Integrity Lecture Series.
- * *Second Year:* Students form their Doctoral Supervisory Committee by the end of December, define their doctoral projects, take additional elective courses, participate as teaching assistants for two quarters, and hold their committee meeting. Students form their doctoral Supervisory Committees by the end of December, define their doctoral projects, take additional elective courses, participate as teaching assistants for two quarters, and hold their committee meetings.
- * *Third Year and Beyond:* By the end of spring quarter of the third year, the student completes the General Examination and is conferred official Ph.D. Candidacy by the Graduate School. The student then focuses on the dissertation research and continues to meet with the Supervisory Committee each spring quarter to report on research progress and plans for the coming year. When the Supervisory Committee agrees that a student is ready, the Final Examination is scheduled. Upon successful completion of the Final Examination and acceptance of the completed dissertation by the Graduate School, a student is conferred the degree of Doctor of Philosophy.

Financial Aid

The MCB Program provides a stipend plus tuition for the first year of study. At the end of the first year of study, students choose a doctoral committee, and subsequent years of support are provided by the department of the committee chair. Students maintaining satisfactory academic progress receive funding for the duration of their graduate training.

Course Descriptions

See page 534.

Museology

Graduate Program Coordinator
Burke Museum, Box 353010
206-543-9680

The Museology Program is designed to provide the generalized training, knowledge, and skills necessary to pursue a professional career in museum work. The program is directed toward the training of a broad range of museum professionals interested in curation and management of collections in anthropology, art, botany, geology, history, and zoology as well as in interpretive programs and museum administration.

Courses include required core museology subjects as well as a range of classes offering students the chance to specialize in interest areas. Course work is divided between the theoretical and practical aspects of museum operations. Classes take the form of lecture courses, seminars, special lectures by guest speakers, field trips, laboratory and collection management courses, practicums and internships. Since admission to the program is highly selective, classes are small and students have close contact with faculty.

Practical experience, an essential component of the program, is provided by several museological institutions at the University of Washington, including the Thomas Burke Memorial Washington State Museum, the Henry Art Gallery, the Herbarium, the Arboretum, the Fish Collection, and the University Libraries. The Burke Museum acts as the coordinating unit of the program. Located on the campus of the University of Washington, the Burke Museum is Washington state's natural-history and anthropology museum, and is the oldest and largest natural-history museum in the Northwest. It has nationally and internationally ranked collections focusing on the anthropology, geology, and zoology of the Pacific region and Pacific Rim.

Program Requirements

The graduate program in museology is designed to take two years to complete, consisting of six quarters of academic study and research. During the first year, students carry on average between 10 and 15 credits each quarter; during the second year, the number of credits may vary depending on research, practicum, and internship work. Students may enroll for part-time study, but this is discouraged during the first year.

Requirements for successful completion of the Master of Arts degree include:

1. Completion of a minimum of 36 quarter credits, including 27 course credits and 9 thesis or thesis-project credits, with at least 18 credits of course work numbered 500 or above, including a thesis or thesis project.
2. A minimum of three quarters of full-time residence credit or part-time equivalent.
3. Demonstration of reading competence in one foreign language, if required by the student's supervisory committee due to the student's area of specialization.
4. Completion of an internship in an off-campus museum or related agency approved by the supervisory committee prior to submission of the student's thesis or thesis project.
5. Presentation of a thesis proposal by the beginning of the fourth quarter of study.
6. Successful completion of an oral examination, covering both the thesis topic and the field of museology in general, following submission of the thesis or thesis project.
7. Completion of all degree requirements within six years.

The following courses are required of all students unless exempted by petition to the Program Coordinating Committee or credited for relevant course work completed at other universities: MUSEUM 480, 481 or 490 or 491, 482, 483, 498, 590, 591, 592, 593 or 594, 595, 600, 700 or 710. In addition, two or more courses are required in an academic discipline relevant to the area of specialization.

The Museology Program also offers a Graduate Certificate in Museum Studies as an option for graduate students in other degree programs at the University. To qualify, students must take a specified minimum set of four key courses in areas that emphasize either collection research and management, or museum administration and interpretation, and that include hands-on work experience. Information and application materials for the certificate can be obtained from the Museology Program office.

Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications completed and postmarked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

Course Descriptions

See page 535.

Near and Middle Eastern Studies

Graduate Program Coordinator
311 Loew Hall, Box 352192
206-543-6398

The interdisciplinary Ph.D. program in Near and Middle Eastern Studies is designed for students who wish to pursue research with a comparative perspective in Near Eastern languages and literature: Arabic, Hebrew, Persian (or Dari or Tajik), Turkish and Central Asian Turkic languages; Near Eastern linguistics; Islamic topics, namely, Islamic law, history, institutions, theology, and mysticism; comparative religion: Judaism, Christianity, and Islam; and interdisciplinary investigations of modern topics using the social sciences. The program is administered by an interdisciplinary Graduate School faculty group. The program of studies includes courses offered in the Department of Near Eastern Languages and Civilization, the Jackson School of International Studies, and other departments on campus. Students in the program must take courses in both the humanities and social sciences.

Degree Requirements and Satisfactory Progress

Specific course work and areas of concentration will be determined by the student's interests within the framework of the degree and satisfactory progress requirements listed below.

1. Within 18 months of admission, demonstration of a general knowledge of history and culture in one of the following general fields: Islamic civilization; Arabic, Hebrew, Persian, Turkish, or Central Asian Turkic languages and literature; the modern Middle East; or comparative religion either through previous degree work or through examination administered by the program.
2. Within three years of admission, completion of two advanced courses in the humanities, one of which must be in the Department of Near Eastern Languages and Civilization (NELC), and two advanced courses in the social sciences, one of which must be in the Department of History. These courses are in addition to work the student may have done at the B.A. and M.A. level.
3. Within three years of admission, completion of a graduate seminar. Two graduate seminars are required if none was taken at the M.A. level.
4. A student will be expected to have studied three languages, two of which must be regional languages and one of which must be a "Western" European language other than English, such as French, German, Italian, Russian, or Spanish. The student's Supervisory Committee will decide whether a fourth language will be required and whether the fourth required language will be European or regional. Students pursuing language-related work may anticipate a fourth required language, whereas those pursuing social-science-related studies may not. Before the General Exam listed below may be taken, the student must complete the language requirements including the second-year level in a regional language different from the two languages offered at the time of admission if both were not regional languages.
5. *Disciplinary Method and Theory Requirements.* For all students conducting field work or working with documents, whether social science or humanities focused, and for all social science-oriented students, the following courses are strongly encouraged: (a) ANTH 550, Field Techniques of Anthropology, and (b) POL S 491, Political Research Design and Analysis; or (c) their equivalents in appropriate disciplines.

For those students doing both humanities-oriented research and not conducting field work, two method and theory courses in the appropriate discipline or disciplines (e.g., comparative literature, philosophy) are required.

6. *Disciplinary Core Courses.* Each student is required to take two disciplinary core courses in the appropriate fields. Core courses (or field courses) survey the literature, methods, and theoretical issues involved in a broad field of inquiry, as opposed to elective topical courses, which cover a much smaller area. Core courses should be chosen according to the anticipated research interests and fields for preliminary examination of each student. For example, these core disciplinary courses might focus on comparative politics, comparative religion, feminist theory, ethnicity and nationalism, analysis of linguistic structures, seminar in cognitive anthropology, comparative legal institutions, or international political economy. Courses on a narrow field of inquiry (such as Arab-Israeli conflict) do not constitute field or core courses, though they may contribute to a student's general field.

Annual Review

A subcommittee of the Near and Middle Eastern Studies program faculty will meet each spring to review the progress of all students in the Ph.D. program. Either the chair of the student's committee, the program's graduate adviser, or the program's director will inform students of the results of this annual review.

Ph.D. Examinations and Dissertation

The student will be expected to take the following examinations: (1) preliminary exams consisting of an area of specialization exam and a theory and discipline exam; (2) a General Examination, consisting of a take-home part and an oral part; and (3) a Final Examination, which is the Ph.D. thesis defense.

Students must meet the general University requirements concerning admission to candidacy for the doctoral degree, the dissertation, and final examinations, including an oral examination.

A student's Ph.D. supervisory committee shall consist of no less than three members of the University of Washington's Graduate School faculty as well as a representative of the Graduate School (GSR). The chair of the committee must be an active member of the Graduate School faculty. At least two members of the committee must be members of the Near and Middle Eastern Studies faculty group. Additional members may be asked to join the committee.

Students will write a dissertation as the final requirement for the Ph.D. degree. The topic of the dissertation will be set in consultation with the Ph.D. candidate's supervisory committee.

Admission Deadline

The application deadline for autumn quarter admission is February 1. Applications which are completed and postmarked on or before this date will be reviewed by the appropriate admission committee. Late applications may be submitted until April 15, although consideration is not guaranteed if enrollment targets have been met.

Neurobiology and Behavior

Graduate Program

Graduate Program Coordinator
T471Health Sciences, Box 357270
206-685-1647
neubehav@u.washington.edu

Understanding the brain represents both a major scientific challenge and a wonderful research opportunity. Investigations into the mechanisms of neural function require an interdisciplinary approach using the knowledge base and techniques of anatomy, biochemistry, molecular biology, physiology, pharmacology, and the behavioral sciences. Neuroscientists and their students must use these different approaches in their research and training if they are to make inroads to solving the major questions in neuroscience.

The University of Washington has met this challenge by establishing the interdisciplinary graduate program in Neurobiology and Behavior. The laboratories of more than 90 faculty members in 15 departments have combined efforts to form the doctoral training program, continuing a long history of collaborative efforts that cross both departmental and University boundaries.

The program is designed to allow students to obtain both broad training in the neurosciences and more intensive course work in specific areas of interest. The program emphasizes flexibility and encourages students to take responsibility in the design of their own curriculum. Students have the opportunity to work with faculty whose interests span the breadth of neuroscience research. Graduates of the program are well prepared for a variety of careers involving academic, research, industrial, and public policy positions.

Key aspects of the graduate program that are common to all students include (1) a year-long course which provides a core of knowledge in the neurosciences, (2) quarterly first-year laboratory rotations and rotation talks attended by all students in the program, (3) a biweekly seminar series featuring both visiting and local scientists, (4) a biweekly journal club designed to provide students with an introduction to the subsequent week's seminar, and (5) a program-wide retreat, combined with a campus-wide poster session where students and postdoctoral candidates can present their Society for Neuroscience Annual Meeting posters. Thus, the program exposes students throughout their graduate career to the most exciting and current research and concepts covering all areas of neuroscience.

Application Process

Students who have emphasized either biological or physical sciences in their undergraduate careers are invited to apply. Applicants are requested to send a copy of their academic record; GRE scores, including, if possible, scores on a subject test such as chemistry, physics, molecular and cellular biology, psychology, or biology; and three letters of recommendation from the persons who can best evaluate their potential for success in graduate study. New students enter the graduate program September 15. Applications received on or before the deadline are given full consideration. Applications received after the deadline are considered at the discretion of the directors.

Research Facilities

Participating departments are located in the Health Sciences Center and in the College of Arts and Sciences. Extensive research facilities in all areas of neurosciences are available to the student. The University maintains two major natural and health-sciences libraries in addition to individual departmental libraries. Facilities in the participating departments include electronics and machine shops, instrumentation for synthesis and sequence determination of nucleic acids and proteins, calcium imaging, confocal microscopy, and computer facilities. Equipment for ultrastructural studies is readily available. The resources of the Regional Primate Research Center, the W. M. Keck Center for Advanced Studies in Neural Signaling, and the Friday Harbor Laboratories are also available to the student.

Financial Aid

The program offers full stipend and tuition support to students through traineeships derived from NIH training grants and private foundation support and through research assistantships supported by the University or research grant funds. Students with satisfactory academic progress can anticipate that funding will continue for the duration of their program.

Course Description

See page 535.

Nutritional Sciences

Graduate Program Coordinator
305 Raitt, Box 353410
206-543-1730
nutr@u.washington.edu

The Interdisciplinary Graduate Program in Nutritional Sciences offers programs of study leading to Master of Science (M.S.), Doctor of Philosophy (Ph.D.), and Master of Public Health Nutrition (M.P.H.) degrees. The graduate program is designed for the needs of students with a strong science background who wish to pursue (1) advanced training in nutritional science or clinical research, (2) advanced training in nutritional epidemiology and diet-disease interactions, or (3) training in public health nutrition practice. Additional training in clinical and community nutrition is provided to those students who wish to satisfy the didactic and internship requirements of the American Dietetic Association, prior to obtaining Registered Dietitian (R.D.) status.

The principal areas of study are biochemical and molecular nutrition, clinical nutrition, and community or public health nutrition. Members of the core faculty represent the School of Public Health and Community Medicine, the Fred Hutchinson Cancer Research Center, and the University of Washington Medical Center. The program also draws on a larger group of interdisciplinary faculty from the College of Arts and Sciences, Schools of Medicine and Nursing, other units on campus, and from affiliated institutions in the Seattle area.

Each program of study is designed by the student in consultation with, and with the approval of, a supervisory committee. All students begin working on a research project under the supervision of an appropriate faculty member in the early stages of their graduate experience. Public health field placements, which follow the first year of required coursework, are an integral part of the M.P.H. curriculum.

The research environment at the University of Washington is exceptional. Research facilities in Raitt Hall include modern laboratories, computer facilities, and a vivarium. Students also have access to faculty mentors and research facilities through the Medical Center, the Fred Hutchinson CRC, the Clinical Research Center, and the Clinical Nutrition Research Unit. Additional clinical facilities include Harborview Medical Center, Northwest Kidney Center, Children's Hospital and Regional Medical Center, Pacific Medical Center, the Cancer Care Alliance, and the Center for Human Development and Disabilities.

Students may enter the graduate degree program after completing a bachelor's or a master's degree. Previous coursework in chemistry, biochemistry, and human physiology is required. Students who wish to supplement their degree program with ADA-approved training leading to R.D. status must complete all didactic requirements before applying to the supervised dietetic internship.

The internship specialty areas are clinical and community nutrition. Applicants should contact the Dietetic Internship Director for detailed admission requirements.

Course Descriptions

See page 536.

Quantitative Ecology and Resource Management

Graduate Program Coordinator
304 Loew Hall, Box 352182
206-616-9571
qerm@u.washington.edu

The Interdisciplinary Graduate Program in Quantitative Ecology and Resource Management (QERM) provides a unique opportunity for students to study the application of statistical, mathematical, and decision sciences to a broad array of terrestrial and marine ecology, natural resource management, biometrical, and mathematical biology problems. It is designed to attract mathematically trained students interested in working on contemporary ecological or resource management problems from a quantitative perspective. QERM offers programs of study leading to Master of Science and Doctor of Philosophy degrees.

Faculty associated with the QERM program come from several campus units, including Statistics, Applied Mathematics, Forest Resources, Aquatic and Fishery Sciences, Marine Affairs, Biology, Biostatistics, Genetics, Economics and Public Affairs. This pool of faculty talent is available to enrich the academic experience of all QERM students.

Admission Requirements

Applicants are expected to possess an awareness and keen interest in applying quantitative methods to natural resource management, marine or terrestrial ecology, or mathematical biology problems. Minimum requirements for admission to the graduate program include a baccalaureate degree from an accredited institution, a GPA of 3.00 in the last two years of college work, and approval of the program and the Graduate School. Applicants should have either a strong mathematical or biological (ecological) background and must perform well on the quantitative and analytical sections of the Graduate Record Examination.

Applicants to the program must submit a completed QERM program application, UW Graduate Admissions application (and required fee), transcripts of all previous college course work, Graduate Record Examination scores (general test only is required), TOEFL score (only for applicants who are non-native English speakers), three letters of recommendation, a brief narrative statement of objectives and curriculum vitae. Admission is also dependent upon program resources and fit between student and program. Admissions are limited to autumn quarter. The application deadline is January 15.

Program Requirements

The core course work for the Master of Science degree reflects the expectation that the student has a fundamental understanding of the principles of statistical inference and ecological modeling. Course electives should further this understanding in an area of emphasis selected by the student from among biometry, mathematical modeling, and resource management. Additional elective coursework in basic biology and ecology is expected to give students greater insight into the environmental systems in which they expect to apply their quantitative training.

Requirements for successful completion of the Master of Science and degree include:

1. Completion of a minimum of 36 quarter credits, including 27 course credits and 9 thesis credits, with at least 18 credits of course work numbered 500 or above, including a thesis.
2. Numerical grades must be received in at least 18 quarter credits of course work taken at the University of Washington.
3. Successful completion of qualifying examinations in statistical theory and applied methods at the completion of the first year of study.
4. A seminar on results of the research and oral defense of the thesis are required for graduation.

Each student also must meet the general University requirements for graduation.

The following courses are required of all students unless exempted by petition to the Graduate Program Coordinator: STAT 512 and STAT 513 (statistical inference), QERM 550 (ecological modeling), AMATH 422 (mathematical biology), QERM 514 (analysis of ecological and environmental data), QERM 597 (seminar) and QERM 700 (master's thesis credits, minimum of 9 credits).

Students entering the program with little or no statistical background are advised to take one or more of the following courses in their first year for preparation in this area: STAT 421 (applied statistics and experimental design), STAT 394 and STAT 395 (probability I and II) and possibly STAT 341-342 (introduction to probability and statistical inference) or STAT 481 (introduction to mathematical statistics). These students then take STAT 512 and STAT 513 (statistical inference) in the following academic year and the statistics theory qualifying examination given that year. These students will take the applied methods qualifying examination at the end of their first year of study.

For students pursuing the Doctor of Philosophy degree, both the applied methods and statistical theory qualifying examinations must be passed at the doctoral level. Students are allowed two attempts to successfully pass each component at the doctoral level.

Students must complete at least three years of graduate study (90 credits) and complete a dissertation to earn the Doctor of Philosophy degree. Completion of a master's degree program may be applied toward one year of the doctoral program. The core QERM courses must be taken if the student has obtained a master's degree from another program. Preparation for a Ph.D. dissertation requires registration for 27 credits of QERM 800 (dissertation research). Each student also must meet the general University requirements for graduation.

Financial Aid

Fellowships, teaching assistantships, and research assistantships are available each year. This assistance is from either the Graduate School or one of the campus units contributing faculty to the QERM program. They generally cover the nine-month academic year, although provisions may be made for summer support. Tuition is normally included as part of the financial package. Funding decisions are made yearly; attempts are made to continue support for students making satisfactory progress.

Course Descriptions

See page 537.

Quaternary Research Center

19 Johnson

Quaternary studies focus on the processes that presently shape the natural environment and have operated over approximately the past two and a half million years (Quaternary period). A knowledge of Quaternary events facilitates an understanding of earth history in relation to the modern environment and has predictive value with regard to present-day and future environmental changes.

Quaternary research is typically interdisciplinary, and thus it commonly involves related interests of two or more academic units. The Quaternary Research Center was established in 1967 to foster such interdisciplinary studies on a cooperative basis.

The center has the following goals:

1. To understand environments and climate changes of the past two and a half million years in the context of modern surface processes, which include historical changes, prehistoric postglacial environments, and Ice Age events.
2. To serve as a catalyst in fostering interdisciplinary studies in the fields of atmospheric sciences, archaeology/anthropology, botany, engineering, fisheries, forestry, geology, geophysics, oceanography, pedology, and zoology.
3. To provide a scientific perspective on the scale of modern and man-made environmental changes, including climate changes, in the context of recent earth history.

4. To conduct a curriculum jointly with other disciplines in the training of graduate students in Quaternary-oriented studies.
5. To seek applications of Quaternary studies to modern environmental problems that will help predict consequences of policy decisions.

Graduate Program

Students associated with the center obtain their degrees through cooperating departments. Students interested in graduate work at the center should apply to the department of their choice but plan to do their research in a Quaternary-related subject.

Research Facilities

The research laboratories of the center provide an array of modern facilities for investigation of Quaternary problems.

QRC Resource Center. This specialized collection, dealing with a wide range of Quaternary topics, is among the most extensive in North America. It includes books, monographs, theses, journals, and maps, and houses a large, diverse reprint collection. Searches for library material can be conducted via the QRC Web page.

Cosmogenic Nuclide Laboratory

John Stone, Director

The UW Cosmogenic Nuclide Laboratory analyses rare radionuclides produced by cosmic ray bombardment of the Earth's surface. These nuclides are useful for surface exposure dating and the study of geomorphic rates and processes. Current projects include work on quaternary glaciations of Antarctica, Europe, and North America; dating of landslides and volcanic eruptions; and studies of erosion in both tectonically active and ancient, stable landscapes. The laboratory has sample preparation facilities and clean labs for extraction of Al-26, Be-10, and Cl-36. For additional information, visit the laboratory's Web site.

Geochemistry Library

Ronald S. Sletten, director

The Geochemistry Library conducts analyses of natural waters, soil, and sediment. Instrumentation includes ICP-OES, ICP-MS, laser diffraction particle size analyzer, and total organic/inorganic carbon analyzer for water samples. The library also conducts C-13 CP-MAS-NMR for natural organic and pulsed field gradient PFG-NMR for diffusion studies of water in porous media. The primary research foci are weathering, elemental cycling, and studies of permafrost soils. Current projects include investigation of biocomplexity of carbon cycling in Arctic soils in Greenland and physico-chemical soil processes in Antarctica and Alaska.

Periglacial Laboratory

Bernard Hallet, Director

Research in the Periglacial Laboratory focuses on diverse processes at the interface between glaciology and geomorphology that are fundamental to understanding landscapes and soils in alpine and polar regions. Founded by Link Washburn, the laboratory has a long history of experimental research on periglacial processes with special attention given to the complex phenomena associated with freezing soils and rocks. Recently the lab has also served as a base of support for extensive field work involving electronic instrumentation to monitor surface processes in the Arctic, Antarctica, the Himalayas, southeast Tibet, and other regions across the globe.

Stable Isotope Laboratory

Eric J. Steig, Director

The Stable Isotope Laboratory is the main center for stable isotope studies for the QRC. The current emphasis in the laboratory is the development of high-resolution climate records covering the last ten millennia, from ice cores in the Canadian Arctic, Greenland, and Antarctica. Facilities in the laboratory (now undergoing renovation) include off-line and online preparation systems for D/H and 18O/16O on water 13C/12C on carbonates and organic materials, and 15N/14N on nitrate and organics. Additional information, data, and other resources are available via the laboratory's Web site.

Course Descriptions

See page 537.

Urban Design and Planning

Graduate Program Coordinator
311 Loew, Box 352192
206-543-6398

The Ph.D. in Urban Design and Planning at the University of Washington is one of 39 Ph.D. programs in urban and regional planning in North America, and one of the oldest, founded in 1967. This program brings together faculty from disciplines ranging from Architecture to Sociology to focus on the interdisciplinary study of urban problems and interventions. Covering scales from neighborhoods to metropolitan areas, the program addresses interrelationships between the physical environment, the built environment, and the social, economic, and political institutions and processes that shape urban areas. The breadth of this program permits students to pursue doctoral studies in the various aspects of urban design and planning as well as in a number of related social science, natural resource, and engineering areas.

The Program seeks to prepare scholars who can advance the state of research, practice, and education related to the built environment and its relationship to society and nature in metropolitan regions throughout the world. The program provides a strong interdisciplinary educational experience that draws on the resources of the entire University, and on the laboratory provided by the Seattle metropolitan region and the Pacific Northwest. The program emphasizes the educational values of interdisciplinarity, intellectual leadership and integrity, and the social values of equity, democracy and sustainability. It seeks to promote deeper understanding of the ways in which public decisions shape and are shaped by the urban physical, social, economic, and natural environment. The program envisions its graduates becoming leaders in the international community of researchers, practitioners and educators who focus on improving the quality of life and environment in metropolitan regions.

Doctor of Philosophy

Admission Requirements

Admission to the Ph.D. program is based on evidence of promise of high scholarly achievement and research orientation. The applicant's statement of purpose, Graduate Record Examination (GRE) test results, letters of recommendation, and examples of past work constitute the basis for the admissions evaluation.

Applicants typically have a Masters degree in fields ranging from planning and public affairs to natural and social sciences. Students interested in a professional degree in urban design and planning should apply to the master's program in urban design and planning.

Application Deadline: All application materials are due by Feb. 1. International applicants are encouraged to submit the Graduate School on-line application form by Nov. 1.

For more information, see the program's Web site.

Degree Requirements

The Ph.D. in Urban Design and Planning requires 90 credits and is divided into three main phases.

Phase I: The Core Curriculum

The core curriculum defines the intellectual foundation of the program. While the program retains considerable flexibility in defining a research agenda within the broad umbrella of urban and environmental planning and policy, it provides a common foundation for all students to build upon. The following are the core curriculum requirements. Students enter the program with a master's degree, in fields ranging from planning and public affairs to natural and social sciences. Depending on the academic preparation of the student prior to matriculation, the core requirements can be met within one to two years.

Required Courses: Phase I requirements involve five courses, and should be completed during the first year, unless schedule conflicts make this

infeasible. Courses from Phase II requirements may also be taken in the first year, to accelerate completion of the curriculum requirements.

- * Core Sequence: URBDP 591, URBDP 592, URBDP 593
- * Restricted Electives (before completion of Phase I):
 - o Qualitative Research Methods - One of the following: URBDP 598, GEOG 425, HIST 598, HSERV 526, POL S 493.
 - o Quantitative Research Methods - One of the following: CS&SS 594, CS&SS 504, CEE 584

Phase II: Area of Study

Students admitted to Phase II form a supervisory committee to oversee their progress through the rest of their academic program. Students develop with their supervisory committee a description of their proposed areas of study. These will define areas of scholarship that must demonstrate an interdisciplinary research approach to an application within urban and environmental planning and policy. The description should develop a curriculum proposal approved by the supervisory committee that addresses the following advanced study requirements:

Phase II Curriculum Requirements: Phase II requirements involve seven courses and a teaching seminar, in addition to advanced courses directly related to the area of study selected by the student. Some of these courses may be taken in the first year.

- * Urban Processes and Patterns: Three of the following: URBDP 479, URBDP 498, URBDP 561, URBDP 598, URBDP 598, GEOG 440, GEOG 448, GEOG 450, GEOG 466, GEOG 477, GEOG 478, GEOG 479, GEOG 578, SOC 490, POL S 481.
- * Research Design and Methods: Two of the following: CS&SS 536, CS&SS 560, CS&SS 567, CS&SS 594, CS&SS 529, CS&SS 544, CS&SS 566, URBDP 422, URBDP 525, URBDP 530, URBDP 571, GEOG 460, GEOG 461, PB AF 526, SOC 526, SOC 529

- * Urban and Environmental Design and Planning: Two of the following: URBDP 465, PB AF 513, PB AF 517, PB AF 518, URBDP 598, URBDP 598, POL S 574, CFR 592, ARCH 561, PB AF 565.
- * Teaching Methods: One teaching seminar and experience as a TA for at least one quarter, before completion of phase III. The following courses or a suitable alternative satisfy this requirement: GEOG 599, GRDSCH 630

General Examination: A critical review of the literature in the area of study must be developed by the student, which integrates interdisciplinary research on the area of study selected by the student, and identifies areas of potential research opportunity that may subsequently form the basis for a dissertation proposal. The review should demonstrate broad familiarity with relevant research in the chosen area, and with the range of theory and methods applied within the reviewed literature.

Phase III: Dissertation

Once the student passes the General Examination, he/she is advanced to the level of doctoral candidate, and is expected to build on the critical review of the literature to develop a dissertation proposal. The dissertation proposal should demonstrate the characteristics of interdisciplinarity, relevance to urban and environmental planning and policy, and potential for contribution to scholarship.

Financial Aid

The Interdisciplinary Ph.D. Program in Urban Design and Planning attempts to provide funding for doctoral program applicants in a way that makes the program attractive to the strongest potential applicants, ensures their effective mentoring while in the program, and actively engages and energizes faculty to improve the program and to bring research funding to support students.

Interdisciplinary Undergraduate Programs

Program on the Environment

274 Mary Gates Hall, Box 352802

The Program on the Environment (PoE) fosters and promotes interdisciplinary environmental education at the UW. As an interdisciplinary program merging multiple fields of study, PoE draws faculty from a wide array of disciplines, providing a unique opportunity for students and faculty to explore complex environmental issues from multiple perspectives.

Undergraduate Program

Adviser
274 Mary Gates Hall, Box 352802
206-616-1208 or 206-616-2461
poeadv@u.washington.edu

The program on the Environment offers the following programs of study:

- * The Bachelor of Arts degree with a major in environmental studies
- * A minor in environmental studies

Bachelor of Arts

Suggested First and Second-Year College Courses: Major requirements 1-5 as listed below.

Department Admission Requirements

Students in good academic standing can declare this major at any time.

General Education Requirements

All majors must satisfy the College of Arts and Sciences general education requirements.

Major Requirements

85-90 credits as follows:

1. One course (5 credits) from MATH 112, MATH 124, MATH 145, Q SCI 110, or Q SCI 291.
2. One course (5 credits) from STAT 220, STAT 301, STAT 311, QMETH 201, or Q SCI 381.
3. One course (5 credits) from CHEM 120 or CHEM 142.
4. One of the following (5 to 10 credits): BIOL 116, or BIOL 161 and BIOL 162, or BIOL 180 and BIOL 200 (or BIOL 201 and BIOL 203).
5. Core Courses (15 credits): ENVIR 201, ENVIR 202, ENVIR 203.
6. Matrix Courses (40 credits): Choose all courses from one of five options: ecology and conservation, population and health, resources, international perspectives, or an approved individualized curriculum. (The international perspectives option requires a one-quarter, 12-credit minimum, pre-approved study abroad component, which can count towards the matrix and/or the capstone requirements.) A list of approved courses is available on the program web site or from the advising office. In addition to the courses on the approved list, a maximum of 10 credits (of the 40 credits required) may be taken at the 100 and 200 level if pre-approved by the adviser.
7. Capstone Experience (10 credits, to include at least 5 credits of ENVIR 491): ENVIR 490, ENVIR 491, ENVIR 492.

Completion of requirements 1-5 above during freshman or sophomore years (or pre-transfer) is highly recommended.

Minor

Minor Requirements: 30 credits, including 15 credits from ENVIR 201, 202, 203; an additional 15 credits drawn from a list of program "matrix" courses and/or the capstone experience. 10 credits of the additional 15 credits may overlap with the student's major. A minimum of 5 credits must be taken from the program "matrix" outside the general discipline of the student's major. See adviser for list of matrix courses.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The Environmental Studies major offers an interdisciplinary approach to environmental problems and develops the following broad skill sets: taking an integrated approach to environmental issues; recognizing that dealing with the scientific aspect of environmental issues requires grappling with the cumulative nature of scientific disciplines; appreciating that some of the most profound differences in perspective are related to cultural and economic setting; understanding the difference between stating a viewpoint and marshalling evidence to make a compelling argument; being able to find relevant data and evaluate its quality; being able to distinguish between data and interpretation and being able to handle data in a quantitatively appropriate way; being able to present one's viewpoint and/or findings both in writing and orally in a public setting.

Because the degree culminates with a senior capstone experience that requires 210 hours of fieldwork or independent research, all PoE undergraduates develop professional skills specific to their capstone project, and many prepare for the experience by taking suites of courses to develop specific areas of expertise.

Graduates have pursued careers or graduate studies in policy, law, environmental planning, community organizing, environmental health, nonprofit administration, and environmental education.

* *Instructional and Research Facilities:* The Program on the Environment Multipurpose Room, centrally located in 258 Mary Gates Hall, houses a small library of environmental resources, contains computer workstations for students, and serves as a meeting and study space. Because PoE is an interdisciplinary program, its students access resources, laboratories, and field stations across a range of UW departments, colleges, and schools.

* *Honors Options Available:* Departmental Honors. See adviser for details.

* *Research, Internships, and Service Learning:* All environmental studies majors complete a senior capstone experience, which includes an internship with a community-based organization or government agency, an undergraduate research project, and/or international fieldwork or study abroad. Program on the Environment students receive a weekly email listing of internship and career opportunities. For information on identifying internship, research, and career opportunities, see the "Undergraduate Resources" section of the department's Web page.

* *Department Scholarships:* None offered.

* *Student Organizations/Associations:* The UW Earth Club organizes the annual UW Earth Week events and year-round activities such as public-service projects, panel discussions, and social gatherings.

Of Special Note: Many students majoring in environmental studies also pursue a complementary Bachelor of Arts degree in humanities or social science or a complementary Bachelor of Science degree in physical or natural sciences, engineering, forestry, or fisheries. Students electing to pursue either a double major or a double degree are limited to 15 credits of overlap between the two major/degree programs.

Course Descriptions

See page 256.

Quantitative Science

Adviser
171 Mary Gates Hall, Box 352803
206-543-2550
cqs@u.washington.edu

The Center for Quantitative Science is an interdisciplinary program administered by the Office of Undergraduate Education. It provides high-quality instruction in mathematical and applied statistical methods for undergraduate students who major in the biological and ecological sciences, renewable resources management, and environmental studies. The center provides instruction in an atmosphere that emphasizes the use

of quantitative methods to better understand a variety of scientific phenomena. Faculty represent various applied scientific disciplines within the College of Forest Resources and the School of Aquatic and Fishery Sciences.

Students in environmental, biological, ecological, and resource management majors may wish to complete a minor in quantitative science to document their understanding of the mathematical and statistical methods used in these competitive and increasingly quantitative fields.

Minor

Minor Requirements: A 26-30 credits, as follows:

1. Core courses (20 credits): Q SCI 291, Q SCI 292 (or MATH 124, MATH 125); Q SCI 381, Q SCI 482
2. Electives (6-10 credits): Two Q SCI courses at the 300 or 400 level to include one course from Q SCI 480, Q SCI 483, Q SCI 486
3. A minimum grade of 2.0 is required in each course taken as part of the minor

Course Descriptions

See page 540.

School of Law

Dean

W.H. (Joe) Knight, Jr.

Associate Deans

Penny A. Hazelton
Patricia C. Kuszler

Assistant Deans

Dexter Bailey
Mary A. Hotchkiss
Sandra E. Madrid

Established in 1889, the School of Law is a member of the Association of American Law Schools and is on the American Bar Association's list of approved law schools. Graduates of the School are prepared to practice law anywhere in the United States. Additional information about the School is contained in the current School of Law catalog.

Facilities and Services

The School of Law is housed in the new William Gates Hall. It is equipped with classroom, library, lounge, and office facilities.

The Marian Gould Gallagher Law Library is one of the finest law libraries in the country. Its collection, among the largest university law collections on the West Coast, currently contains more than 450,000 bound volumes and volume equivalents of microform. In addition to the extensive main collection, it houses important materials that support the Asian, marine, sustainable international development, and tax law graduate programs and serves as a federal depository for selected United States government documents. An experienced audiovisual staff directs the use of video equipment in the trial advocacy and moot court programs. The library is equipped with the latest in microreaders and printers in order to make full use of the growing microform collection. The library is a subscriber to LEXIS, WESTLAW, the Western Library Network, and other research databases.

Juris Doctor Program

The Juris Doctor degree is conferred upon a student who has met the residence requirements, consisting of nine quarters of at least 12 credits each, and has earned at least 135 credits satisfactory to the School of Law.

As with most law schools in the United States, the first-year courses are required and are designed to introduce students to basic legal skills, foundational subject matter, and the variety of public and private processes with which the profession is concerned. Those courses deal with contracts, torts, property, civil procedure, criminal law, constitutional law, and basic legal skills.

Except for a required course in professional responsibility, the public service requirement, and an advanced writing project requirement, courses in the second and third years are elective. Therefore, a student may choose a program designed to suit his or her interests and needs. J.D. candidates are required to perform 60 hours of public-service legal work during the second or third year.

Admission

New students may enter the School of Law only in autumn quarter. Instruction begins for first-year students a few days earlier than the time set for upper-class students. Beginning students must have received a baccalaureate degree from an accredited college or university prior to commencing the study of law.

All applicants are required to take the Law School Admission Test (LSAT) and to register for the Law School Data Assembly Service (LSDAS). Registration packets and test information are available at most law schools and from Law School Admission Council, Box 2000, 661 Penn Street, Newtown, PA 18940-0998. Email: lsacinfo@lasac.org.

No specific prelaw course is required or recommended, and the School of Law subscribes to the remarks set forth on prelaw preparation in The Official Guide to U.S. Law Schools (2000 Edition). Applications for admission to the next entering class must be postmarked no later than January 15. To be assured of consideration for admission, an applicant must have complete credentials, including the LSDAS report, filed in the

School of Law by February 1. An application fee (at this writing, \$50) also is required.

Transfer Applicants

Students who have completed at least one year at a member school of the Association of American Law Schools may apply to this school for admission with advanced standing with credit for no more than one year of such work. A student who has completed or expects to complete at least two years of work at a member school of the Association of American Law Schools and who expects to graduate from that member school may apply to this school for admission as a non-degree candidate.

Applicants should request application forms and instructions from the admissions office in time to permit filing of all application materials by July 7.

Applications are considered only if vacancies exist. Selection of the applicants is based on evidence either (1) that the candidate can produce above-average work at this law school, or (2) that the candidate will contribute to the diversity of the student body.

Students working on law degrees to be conferred by the University have priority over non-degree candidates in the selection of courses. This policy is in accordance with the general University policy on the registration of nonmatriculated students.

Financial Aid

Students in need of financial assistance may receive University aid, School of Law aid, federal loans, or aid from all of these sources. To be considered for aid, applicants must submit the Free Application for Federal Student Aid (FAFSA) by February 28. FAFSAs are available in December at most college financial aid offices, or may be obtained by writing or calling the Office of Student Financial Aid, 105 Schmitz Hall, Box 355880, University of Washington, Seattle, WA 98195, 206-543-6101, offa@u.washington.edu. Applicants for admission should not wait until they have been admitted before applying for financial aid.

School of Law grants are awarded primarily on the basis of financial need, although scholarship, or other factors may be considered with regard to certain awards. Inquiries concerning School of Law aid should be addressed to Financial Aid Coordinator, School of Law, William Gates Hall, Box 353020, University of Washington, Seattle, WA 98195-3020; uwlwaid@u.washington.edu.

Inquiries

A more detailed statement on admission policy and application procedure is available in the School of Law. Requests for application materials and the University law school bulletin should be addressed to Law School Admissions, William Gates Hall, Box 353020, University of Washington, Seattle, WA 98195-4617; admissions@law.washington.edu; 206-543-4078.

Graduate Program

Graduate Program Coordinator
William Gates Hall, Box 353020
206-543-4937
gradlaw@u.washington.edu

In addition to the professional law program leading to the Juris Doctor degree, the law faculty offers graduate programs leading to the Master of Laws (LL.M.) in Asian and comparative law, the law of sustainable international development, intellectual property law and policy, and taxation. The School of Law offers the Doctor of Philosophy (Ph.D.) degree in Asian and comparative law only.

Master of Laws

Admission Requirements

- * Minimum GPA of 3.00 or B grade-point-average in the most recent two years of study.
- * U.S. applicants must have completed their first degree in law (J.D. or equivalent) at a school accredited by the American Bar Association.

- * International students must have a first degree in law (LL.B., B.Law) or equivalent and a minimum TOEFL score of 580.

Degree Requirements, Asian and Comparative Law

36 credits, as follows:

- * Required courses: LAW B 551 (6), LAW 600 (6), LAW B 550 (3-4); two courses in Asian and comparative law
- * Elective courses: Additional courses, chosen in consultation with adviser, to bring total credits to 36.

Degree Requirements, Intellectual Property Law and Policy

40 credits, as follows:

- * Required core courses: LAW P 501 (8), LAW E 589 (6)
- * Additional requirement for students not trained in the common law system: LAW B 550 (3)
- * At least 16 additional credits drawn from a list of approved elective courses.
- * Research project and thesis

Degree Requirements, Law of Sustainable International Development

40 credits, as follows:

- * 15 credits must be earned in Law School classes. The remaining 25 credits may be earned in any other departments of the University. Sustainable International Development students are required to take courses in at least three departments other than the Law School.
- * Writing and Research Requirement: Completion of a research paper is required and is generally satisfied by LAW B 578 (6).
- * LAW A 545 (4)

Degree Requirements, Taxation

36 credits, as follows:

- * Required courses: LAW T 501 (3), LAW T 502 (3), LAW T 503 (2/3), LAW T 504 (3), LAW T 510 (3), LAW T 511 (1-4)
- * Core electives: Two of the following courses: LAW T 515 (3), LAW T 516 (3), LAW T 521 (3), LAW T 530 (3)
- * Electives: Additional courses, chosen in consultation with adviser, to reach 36 credits for degree

Doctor of Philosophy

Admission Requirements

Admission to the Ph.D. program is limited to exceptional scholar-lawyers who are fluent in English and in another language. Prospective Ph.D. students must normally complete the LL.M. program before being accepted as Ph.D. students. The School does, however, welcome applications from candidates with equivalent academic standing and a demonstrated capacity for advanced research and writing.

Degree Requirements

90 credits, as follows:

- * An LL.M. degree is counted toward the credit necessary for the Ph.D. program.
- * Doctoral thesis seminar (4 credits)
- * Other coursework (26-29 credits): Coursework varies according to student's research interest areas and is determined in consultation with supervising committee
- * Doctoral dissertation (27-30 credits)

Financial Aid

Scholarship funds for graduate students in law are quite limited. Inquiries should be made to Law School Graduate Admissions, William Gates Hall, Box 353020, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu; 206-543-4937. Inquiries

Requests for applications and program brochures for all School of Law LL.M. programs except the LL.M. in taxation, as well as information regarding application procedures, should be addressed to Law School Graduate Admissions, William Gates Hall, Box 353020, University of Washington, Seattle, WA 98195, U.S.A.; gradlaw@u.washington.edu.

Requests for applications and program brochures for the LL.M. in taxation should be addressed to Gloria Strickland, Law School Graduate Tax Admissions, William Gates Hall, Box 353020, University of Washington, Seattle, WA 98195; gradlaw@u.washington.edu.

Course Descriptions

See page 542.

School of Medicine

Dean

Paul G. Ramsey
C314 Health Sciences

Associate Deans

Scott Barnhart
Albert J. Berger
John B. Coombs
D. Daniel Hunt
Eric B. Larson
Richard A. Molteni
Thomas E. Norris
Gordon A. Starkebaum
Andrew A. Ziskind

Assistant Deans

Carol F. MacLaren
Susan G. Marshall
Werner E. Samson

WWAMI Coordinators/Assistant Deans

Dennis Valenzano, University of Alaska (interim)
James R. Blackman, Boise, Idaho
Philip D. Cleveland, Spokane, Washington
Andrew Turner, University of Idaho and Washington State University
Sylvia J. Moore, University of Wyoming
Dwight E. Phillips, Montana State University (interim)

Established in 1946, the School of Medicine is the only medical school directly serving the states of Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI). Located in the Warren G. Magnuson Health Sciences Center, the School operates a decentralized program of medical education (WWAMI) via a regional network of teaching affiliates.

The School's basic-science departments provide educational opportunities for students from all schools and colleges within the University. Clinical teaching programs are conducted at the University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Regional Medical Center, and the Veterans Affairs Puget Sound Health Care System, as well as at other clinical affiliates in Seattle and throughout the WWAMI states.

The School admits 178 medical students to its first-year class and has a total enrollment of about 750 students pursuing the Doctor of Medicine degree. The full-time faculty numbers approximately 1,700 members. The affiliated University residency-training network enrolls approximately 900 house officers. Enrollment in the graduate programs in the basic sciences exceeds 500 students, and approximately 800 postdoctoral fellows are enrolled in various advanced training programs. The School has baccalaureate and graduate programs in occupational therapy, physical therapy, prosthetics and orthotics, and medical technology. The School participates in training a broad spectrum of other allied health professionals. The School is also home for the Physician Assistant Training Program known as MEDEX.

Academic Programs

Doctor of Medicine

Upon completion of the curriculum of the School of Medicine, the M.D. degree is awarded to those candidates who (1) have given evidence of good moral character, (2) have satisfactorily completed the requirements of the curriculum, (3) have fulfilled all special requirements, and (4) have discharged all indebtedness to the University.

Bachelor of Clinical Health Services

Candidates for the Bachelor of Clinical Health Services degree are admitted to the University of Washington at the junior-year level. They pursue an eight-quarter sequence of prescribed studies in the MEDEX Northwest Physician Assistant Training Program. Admission to the professional training program is competitive, administered by MEDEX Northwest within the School of Medicine. Because of the program's emphasis on prior medical experience, the great majority of applicants are working adults who have completed their pre-professional undergraduate course work at other colleges and universities.

Matriculation in the Bachelor of Clinical Health Services degree option is dependent upon both admission to the University and acceptance by MEDEX Northwest. Students who are accepted by MEDEX Northwest but who are not admissible to the University are classified as nonmatriculated students. They earn official University credits and receive a certificate upon completion of the program. For additional information, contact MEDEX Northwest Physician Assistant Program, Box 354725, 206-598-2600.

Bachelor of Science

A program leading to a baccalaureate degree with a major in microbiology is offered through the College of Arts and Sciences.

Bachelor of Science in Medical Technology

A curriculum in medical technology is offered by the Department of Laboratory Medicine. This program provides study in basic laboratory science that includes clinical laboratory training and is designed to prepare knowledgeable and skilled laboratory scientists for a variety of employment opportunities. Information concerning admission to the medical technology program appears under Laboratory Medicine in this catalog.

Bachelor of Science in Prosthetics and Orthotics

The Department of Rehabilitation Medicine offers a Bachelor of Science degree in prosthetics and orthotics. The curriculum provides professional training in the basic sciences and the clinical application, design, and fabrication of prostheses and orthoses. Information concerning admission to the curriculum in prosthetics and orthotics may be found under Rehabilitation Medicine in this catalog.

MEDEX Northwest Certificate Program

MEDEX Northwest is a program designed to train physician assistants. It provides primary-care, midlevel practitioners by training medical personnel with prior clinical experience. The program is accredited by ARC-PA, the Accreditation Review Commission on Education for the Physician Assistant. MEDEX Northwest places 70 to 75 students annually in a variety of sites in Alaska, Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. Successful completion of the program culminates in the award of a Bachelor of Clinical Health Services degree and in a certificate.

MEDEX Northwest is an eight-quarter program. The first four quarters consist of intense clinical and didactic instruction at one of three training locations: Seattle, Spokane, or Yakima. The final four quarters are spent in clinical experiences throughout the WWAMI region. The first five months are spent in a variety of inpatient and outpatient clinical rotations and the last five months are spent in a family-practice preceptorship. The preceptorship is an on-the-job experience tailored to the practice of individual primary-care physicians and emphasizes diagnosis and treatment. At the completion of the program, students are eligible to sit for the national certifying examination for physician assistants.

Special Requirements

Applicants must have a minimum of two years of recent, full-time, hands-on experience in the direct delivery of medical care to patients, or current professional credentials and at least two years of recent experience in an allied health field. Applicants must have completed two college-level English courses (at least one must be in composition), human anatomy and physiology course work totaling at least 10 quarter-credit hours, and at least one science course in a discipline relevant to medicine, such as biology or chemistry. English prerequisite courses must have been taken in a college or university in the United States, Canada, the United Kingdom, Australia, New Zealand, or Ireland. All academic prerequisites must have been awarded with college-level credit with grades of 2.7 (B-) or better.

For additional information, contact MEDEX Northwest Physician Assistant Program, Box 354725; 206-598-2600. Web site: www.washington.edu/medical/som/depts/medex/. Email: medex@u.washington.edu.

Master of Occupational Therapy

The Department of Rehabilitation Medicine offers graduate degrees in occupational therapy. The curriculum provides professional training in the health sciences and in the theory and practice of occupational therapy as it

impacts occupational performance across the life span and in the various arenas of practice. Occupational therapy addresses daily living skills including self-care, work, and leisure/play. Information concerning admission to the occupational therapy program appears under Rehabilitation Medicine in this catalog.

Master of Physical Therapy

The Department of Rehabilitation Medicine offers graduate degrees in physical therapy. The curriculum provides professional education in the basic sciences and in the clinical use of physical therapy evaluation and management strategies in the treatment or prevention of neuromusculoskeletal dysfunction. Information concerning admission to the physical therapy program appears under Rehabilitation Medicine in this catalog.

Master of Science and Doctor of Philosophy

Work leading to master's and doctoral degrees is offered, in accordance with the requirements of the Graduate School, in the departments of Biochemistry, Bioengineering, Biological Structure, Immunology, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics. Master's degree programs are offered by the departments of Laboratory Medicine, Medical History and Ethics, and Rehabilitation Medicine. Students may work toward these degrees concurrently with the M.D. degree, taking additional years beyond the typical four-year medical curriculum.

Concurrent degrees are possible in many other departments and colleges of the University. Recent graduates have pursued concurrent degrees in the basic sciences of medicine and the School of Public Health and Community Medicine. A student who intends to work toward a graduate degree should confer with the chairperson of the department in which graduate study is to be pursued and with the Associate Dean for Academic Affairs of the School of Medicine. Specific requirements for admission to work for advanced degrees appear in the Graduate School section of this catalog. Permission to pursue advanced degrees is granted to medical students only if they are progressing normally in the medical curriculum and show evidence of being able to take on this additional work load.

Doctor of Medicine

Admissions

(These procedures and policies described are subject to change. Information regarding changes is available from the School of Medicine Admissions Office.)

Selection Factors

Candidates for admission to the University of Washington School of Medicine are considered comparatively on the basis of academic performance, motivation, maturity, personal integrity, and demonstrated humanitarian qualities. A knowledge of, and exposure to, the needs of individuals and society and an awareness of health-care delivery issues are desired. Extenuating circumstances in an applicant's background are evaluated as they relate to these selection factors.

Applicants must submit scores from the Medical College Admission Test (MCAT). This exam must be taken no later than autumn of the year before matriculation and cannot be more than three years old at the time of matriculation. MCAT registration blanks are available through premedical advisers or through the Office of Admissions. Under exceptional circumstances, to be determined by the Admissions Committee, the GRE may be considered during the admissions process; however, if accepted, the applicant will be required to take the MCAT prior to matriculation.

The following science course requirements must be completed before matriculation but preferably should be completed by the time of application: A total of 32 semester hours or 48 quarter hours of undergraduate courses divided into (a) Chemistry, 12 semester/18 quarter hours, which can be satisfied by taking any combination of inorganic or organic chemistry, biochemistry, or molecular biology courses; (b) Physics, 4 semester/6 quarter hours; (c) Biology, 8 semester/12 quarter hours; and (d) Other ("open") science subjects, 8 semester/12 quarter hours, which can be met by taking other courses in any of the three categories above.

Although a biochemistry course is not absolutely required for admission to the medical school, it is very strongly suggested for entering students. The biochemistry course for the first-year medical students focuses on molecular mechanisms central to human health and disease and it is taught

with the presumption that participants have already mastered the fundamentals of biochemistry, including molecular genetics, structure and activity of proteins, and metabolism. A comprehensive undergraduate biochemistry course is the most expedient way to gain this knowledge.

Under exceptional circumstances certain course requirements may be waived for individuals who present unusual achievements and academic promise. All candidates must demonstrate substantial academic ability in their major field as well as in the required courses. Candidates should be proficient in the use of the English language and basic mathematics and are expected to have a basic understanding of personal computing and information technologies.

Those students who entered in the fall of 2003 had a mean GPA of 3.69 and the following mean MCAT scores: Verbal, 10.0; Physical Science, 10.3; Biological Science, 10.8; and a median Writing Sample of P.

Completion of three years of course work at an accredited college or university is the minimum required before possible matriculation; however, all entrants in recent years have earned bachelor's degrees. No specific major is advised. A broad background in the humanities and liberal arts is encouraged, indeed expected.

Application Procedure

The University of Washington participates in the American Medical College Application Service (AMCAS). The deadline for submitting an application to AMCAS is November 1 and no waivers are granted. After receiving the application from AMCAS, the School of Medicine will ask qualified individuals to submit a \$35 application fee and supplemental application materials. Every attempt will be made to notify applicants of the final action by the end of March of the year of matriculation.

Residents of the states of Washington, Wyoming, Alaska, Montana, or Idaho are eligible to apply. Individuals with a demonstrated interest in research may apply for the M.D./Ph.D. program (MSTP) regardless of residency. Applicants from outside this five-state region who come from disadvantaged backgrounds or who have demonstrated a commitment to serving underserved populations will be considered. Foreign applicants, in addition to the above requirements, must also have a permanent-resident visa. Applications will not be considered from persons who have failed to meet minimum standards at another medical or dental school.

The deadline for submitting the additional application materials is January 15. These supplemental materials include:

1. A supplemental application form. This will be sent to qualified applicants after the School of Medicine has received the AMCAS application.
2. A 300-word autobiographical statement in which the candidate describes the origin and development of his or her motivation to be a physician and any other issues of importance to the candidate. The applicant may request that the Personal Comments section of the AMCAS application be used to fulfill this requirement.
3. A concise statement, not exceeding 200 words, as to why the candidate wants to attend the University of Washington School of Medicine.
4. A premedical-committee letter of recommendation or three letters from instructors from whom the candidate has taken courses. These letters should be critical evaluations of the candidate's academic ability, strengths and weaknesses, the difficulty of course work undertaken, motivation for medicine, personal maturity, and special attributes and assets.
5. A \$35 fee. This will automatically be waived for those who have qualified for AMCAS fee waivers. Others seeking a waiver of this fee should submit their requests directly to the School of Medicine Admissions Office.
6. Acknowledgment of having read, understood, and of being able to meet, with or without reasonable accommodation, the Essential Requirements of Medical Education at the University of Washington School of Medicine: Admission, Retention and Graduation Standards to be sent with the supplemental application form.
7. Conviction/Criminal History Information Form. Washington state law requires that all individuals who have access to children under 16 years of age, developmentally disabled people, and other vulnerable persons, disclose background information concerning crimes and offenses against these populations.

Candidates from Wyoming, Alaska, Montana, and Idaho will be required to submit residency certifications from their respective state certifying officers. Proof of legal residence for Washington residents also may be requested. Determination of state of legal residence is not made by the School of Medicine; specific instructions regarding this requirement are furnished at

the time of application. Those who enter as residents of Wyoming, Alaska, Montana, and Idaho are expected to spend their first year at the university site in their particular state. Twenty Washington students begin their medical education by spending the first year at Washington State University in Pullman. Offers of acceptance, therefore, are conditional upon agreement to participate in the WWAMI Program.

Inquiries, address changes, or other information regarding the application should be transmitted in writing and directed to the Committee on Admissions, Office of Admissions, Box 356340, School of Medicine, University of Washington, Seattle, Washington 98195-6340; or email askuwsom@u.washington.edu.

Office of Multicultural Affairs

The Office of Multicultural Affairs assists students from disadvantaged backgrounds who are pursuing M.D. or M.D.-Ph.D. degrees. The program nurtures interests in medical careers by providing a variety of support services and enrichment activities in the areas of recruitment, education, admission, retention, and professional development. The School considers applicants from disadvantaged backgrounds or those who have a demonstrated commitment to work with underserved populations. Students should contact the Office of Multicultural Affairs for assistance during the application process. The program offers counseling and advocacy, referrals to University and community resources, tutoring, financial-aid information, and numerous opportunities to interact with other minority health-care professionals within the community. Various student organizations also provide minority medical students a means to interact socially and pursue shared interests, to offer peer support, and to assist with community-outreach activities.

U-DOC is a high-school summer-enrichment program offered by the Office of Multicultural Affairs. It is a six-week program for students who have completed their junior year in high school. U-DOC's goal is to foster, affirm, and encourage high school students' interest in the medical profession by allowing them to further explore medical careers and to obtain a valuable introduction to college life. U-DOC is offered in each of the five WWAMI states.

The Western Consortium Summer Medical Education Program (SMEP) offers undergraduate and some qualified postbaccalaureate students a six-week summer academic-enrichment program that includes biology, chemistry, physics, communications, study skills, and MCAT preparation. Structured clinical and research activities are also offered. Housing, stipends, and travel assistance are available.

A Prematriculation Program for entering minority or disadvantaged medical students is offered for six weeks during the summer. The program is designed to facilitate students' entry into medical school by providing instruction in histology as well as enrichment activities in areas such as study skills, stress management, test-taking skills, research, clinical practice, and community health. Stipends and travel assistance are available to students who qualify.

During the regular school year, the Office of Multicultural Affairs serves as a support network for both the academic and nonacademic needs of students, and facilitates students' access to the multiple resources in the School of Medicine, the WWAMI region, and the community.

The Native American Center of Excellence was established in 1992 as part of the Office of Multicultural Affairs to encourage Native American students to pursue medicine as a career, to promote research on Native American health issues, and to foster the preparation of Native American students for faculty roles in academic medicine. The Center of Excellence provides educational experiences that integrate western medicine with the Native American way of life, offers a variety of support services to promote the academic development of students, and sponsors a variety of educational opportunities within the Native American community.

Inquiries and requests for additional information may be obtained from the Office of Multicultural Affairs, Box 357430, School of Medicine, University of Washington, Seattle, Washington 98195-7430; 206-685-2489.

Medical Scientist Training (M.D.-Ph.D.) Program

A limited number of highly qualified candidates who wish to pursue both the M.D. and Ph.D. degrees are considered annually. M.D./Ph.D. students are permitted a wide choice of research specializations from among numerous disciplines and interdisciplinary areas of biomedical sciences. The program emphasizes continuity of both clinical and basic sciences exposure. Among participating graduate departments and interdepartmental disciplines are

biochemistry, bioengineering, chemistry, environmental health, epidemiology, genetics, immunology, microbiology, molecular biotechnology, pathology, pharmacology, physiology and biophysics, and zoology. The participating interdepartmental and affiliate programs are neurobiology and behavior, molecular and cellular biology. Students can also conduct their research at the Fred Hutchinson Cancer Research Center.

Applicants who wish to be considered for the M.D./Ph.D. program must submit the Medical Scientist Training Program application as soon as possible. Both the application and any supplemental material requested must be completed by January 15. Serious consideration is rarely given to applicants with minimal research experience and/or a cumulative GPA of less than 3.50 or MCAT scores of less than 10 in each category.

Applicants should correspond directly with the administrator of the Medical Scientist Training Program: MSTP
University of Washington
Health Sciences Building, Room I264
Box 357470
Seattle WA 98195-7470
206-685-0762
mstp@pathology.washington.edu
www.pathology.washington.edu/mstp/

Financial Information

Fees and Other Charges

All fees and extra service charges are payable in U.S. dollars and due at the time specified for such fees and charges. The University reserves the right to change any of its fees and charges without notice. Resident tuition for 2003-2004 is \$4,149 per quarter; nonresident tuition is \$9,796 per quarter.

Financial Assistance

Financial aid awards are based on the demonstrated need of the students. All applicants for aid must submit the Free Application for Federal Student Aid (FAFSA). This requires disclosure of financial information from the student and the student's parents. The Federal Direct Stafford Loan (subsidized and unsubsidized), Perkins Loan, and the Primary Care Loan are the primary sources of aid. Institutional loans are also available from the School of Medicine. Limited amounts of grant funds are available to Washington state residents who meet specific funding criteria. Parental information is not required for grant funds, the Stafford Loan, or the Perkins Loan.

Scholarships are available through the School of Medicine scholarship fund. These awards vary in amount and require financial information from the student and the student's parents. There is a separate application for the School of Medicine scholarship, which has a May 31 due date.

Financial aid information is distributed to all accepted applicants. The FAFSA form may be obtained at www.fafsa.ed.gov or from the UW Office of Student Financial Aid or the School of Medicine Financial Aid Office. The deadline for receipt of the financial-aid application by the processor is February 28. Applicants must meet this deadline to be considered for all available aid sources regardless of the status of their admission file. Late applicants are awarded only Stafford and Unsubsidized Stafford loans.

Outside employment is discouraged while the student is enrolled in medical-school course work.

Medical Curriculum

Basic Science Curriculum (148 Credits)

The first two years of the medical-student curriculum is identified as the Basic Science Curriculum. It consists of three phases, or groups, of courses in the human biology series: courses in the sciences basic to medicine, organ systems courses taught by basic and clinical disciplines, and introduction to clinical medicine. The first phase is designed to provide the background in basic disciplines required for the organ-system courses. In the second phase, emphasis is placed upon learning the normal and pathophysiologic properties of several human organ systems, and upon correlating these properties with clinical methods of data collection and problem formulation. Students pursue the Introduction to Clinical Medicine course throughout the first two years, learning to interview patients, obtain a medical history, and perform the physical examination.

Students pursue the Basic Science Curriculum during their first two years in the School of Medicine. The academic demands of the Basic Science Curriculum are scaled so that most students also will be able to take elective courses that will broaden the student's background.

First-Year Required Courses

Microscopic Anatomy (Histology)
Gross Anatomy and Embryology (including trunk and head and neck anatomy)
Mechanisms in Cell Physiology
Biochemistry
Systems of Human Behavior I
Cell and Tissue Response to Injury (Pathology)
Microbiology and Infectious Disease
Introduction to Immunology
Nervous System
Critical Reading and Evaluation of Medical Literature
Introduction to Clinical Medicine

Second-Year Required Courses

Cardiovascular System
Respiratory System
Principles of Pharmacology I
Endocrine System
Systemic Pathology
Genetics
Skin System
Gastrointestinal System
Epidemiology
Hematology
Musculoskeletal System
Medicine, Health, and Society
Urinary System
Systems of Human Behavior II
Principles of Pharmacology II
Reproduction
Nutrition for Physicians
Introduction to Clinical Medicine

Clinical Curriculum (148 Credits)

The clinical curriculum is pursued in the third and fourth years of medical school. It includes prescribed clerkships to be completed by all students (84 credits or 42 weeks) in family medicine, internal medicine, obstetrics and gynecology, pediatrics, psychiatry, and surgery, plus clinical electives (32 credits or 16 weeks) in four clinical areas including clerkships in rehabilitation medicine/chronic care, emergency care/trauma, neurology, and surgery electives. Additional clinical or non-clinical selectives (a minimum of 32 credits or 16 weeks) are also required.

During the clinical curriculum, students gain clinical knowledge and gradually increase their clinical problem-solving abilities while working as junior members of the medical-care team. Each team is headed by a faculty clinician working in one of the medical school-affiliated hospitals, clinics, or practices.

Independent Investigative Inquiry

In addition to the basic and clinical curricula, each student must complete 8 credits in independent study and investigation in one or more of the biological, behavioral, sociocultural, or epidemiological sciences basic to medicine, culminating in a scholarly product or written paper. The purpose of this requirement is for the student to gain an understanding of the philosophy and methods of scientific investigation.

WWAMI Program

The WWAMI Program was initiated in 1971 as an effort to decentralize medical education to provide a broader range of educational opportunities for students, and to address the need for primary-care physicians oriented toward rural practice. It is an integral part of the undergraduate medical curriculum and is a fully accredited program of the School of Medicine. The WWAMI Program is named for the five states (Washington, Wyoming, Alaska, Montana, and Idaho) that share resources and responsibilities in the regional educational program. Funds appropriated to the WWAMI Program by the Wyoming, Alaska, Montana, and Idaho legislatures assure each state of positions for its students in the entering medical class each year.

First-Year Training

In the first year of the WWAMI Program, approximately 40 percent of the students admitted to the University's School of Medicine receive the first year of medical school training at Washington State University, the University of Wyoming, the University of Alaska, Montana State University, or the University of Idaho. Washington State University positions not filled by volunteers are assigned by lottery. Every Washington-resident applicant should recognize the opportunity of assignment to Washington State University during the first year. Students from Wyoming, Alaska, Montana, and Idaho attend their home-state institutions. While at these institutions, they enroll in prescribed one-year medical school basic-science courses taught by on-site science faculty and are provided supplemental resources from the University of Washington's School of Medicine faculty. These students join their classmates at the University of Washington's campus in Seattle for their second year of medical studies.

Third- and Fourth-Year Training

At the conclusion of the second year, students enter the portion of the curriculum that is predominantly clinical. Required, selective, and elective clerkships are described above. As part of the clinical training, students complete clerkships at the University of Washington, at its affiliated hospitals, or at community clinical units located in the five-state region. During the third and fourth year clerkships, School of Medicine full-time and clinical faculty members provide supervised clinical training in required as well as elective clerkships throughout the WWAMI region.

Enrichment Opportunities

Students may enhance their medical education through a variety of sponsored activities that offer students an opportunity to explore areas of special interest, such as working in rural or urban clinics that serve medically underserved communities, undertaking medical research projects, or participating in an international exchange program with a developing country. Brief descriptions of three of the more formally structured programs follow.

Rural/Underserved Opportunities Program (RUOP)

This program exposes students to rural medicine and utilizes clinical training sites in all five states. For one month during the summer between the first and second years, students work with physicians in small communities, offering a chance to better understand the challenges and opportunities in these settings. Students receive a stipend supported by the Family Health Foundation, the Academy of Family Physicians, Area Health Education Centers, and the School of Medicine.

Medical Student Research Training Program

Summer research opportunities are offered to UW medical students interested in gaining valuable experience from training in medical research. This research is planned and carried out under the supervision of a faculty sponsor and is undertaken during the summer between the first and second years. Student trainees in the program receive a stipend supported largely by gifts given by donors specifically to fund student research. The project is ten weeks, full-time, on a working schedule of forty hours per week, and the student may not be enrolled in courses for credit during this time. At the conclusion of the summer, the students prepare posters that are presented as part of the Medical Student Research Forum.

Student Evaluation and Promotion

The awarding of the Doctor of Medicine degree is contingent upon satisfactory completion of academic and noncognitive requirements. The latter includes the acquisition of behavioral patterns and attitudes consistent with the School's professional standards and the oath that all students take at the time of graduation. As such, student evaluation is based upon observations by the faculty and others involved in teaching of the student's behavior and conduct as well as papers and examinations. Every student is required to pass Steps 1 and 2 of the United States Medical Licensing Examination, all University of Washington examinations, and complete an approved Independent Investigative Inquiry project before receiving the Doctor of Medicine degree. Periodic reviews of student performance are conducted by the School's Student Progress Committee. Students are informed of their deficiencies and the remedial requirements, if any, for these deficiencies. Dismissal from the School may occur if the student fails to maintain an acceptable academic record, fails to follow academic directives provided by the School's committees, or fails to develop attitudes and behavioral patterns appropriate to a career in medicine.

The Faculty Council on Academic Affairs reviews the Student Progress Committee's actions, and the Dean of the School of Medicine has final approval of the committee's and council's recommendations. A review mechanism is available within this process. Once dismissal or withdrawal from the School has occurred, the student may petition for reinstatement through the Faculty Council on Academic Affairs. Reinstatement will not be considered without substantial evidence that the problems causing the dismissal or withdrawal have been resolved. Only one reinstatement petition through the Faculty Council on Academic Affairs is allowed. If more than one year elapses after the withdrawal or dismissal, the individual may be required to apply for readmission through the admissions process. If a reinstatement petition is denied by the Faculty Council, the decision is final with no further avenue for review. Subsequent requests for admission must be directed through the standard admissions procedures.

Honor Society

Alpha Omega Alpha (AOA) is a national honor medical society. A charter as Alpha of Washington was granted to the School of Medicine in 1950 by Alpha Omega Alpha. Members are elected by the membership of Alpha Omega Alpha on the basis of high scholarship and good moral character. The purpose of AOA is to recognize and perpetuate excellence in the medical profession. Its goals are to promote scholarship and research in medical school, to encourage high standards and conduct, and to recognize high attainment in medical science, practice, and related fields. Its motto is "Worthy to serve the suffering."

Grading System

For students entering in 2002 and subsequent years, the grades awarded in each course in the M.D. curriculum are Pass or Fail in the first-year basic-science curriculum; Honors, Pass, or Fail in the applied-science curriculum; and Honors, High Pass, Pass, or Fail in the clinical curriculum. The School's goal is to provide a curriculum that defines the competencies to be achieved by the student at each level. However, a pattern of documented evaluator concerns about a student's performance may indicate unsatisfactory performance when the record is viewed as a whole, even though passing grades have been assigned. Honors may be awarded in a course on predetermined criteria that may involve additional work in the subject as selected by the student. The grading system precludes the ranking of students and no class standing is assigned.

The School of Medicine reserves the right to revise or modify the curriculum, system of evaluation, or graduation requirements.

Graduation with Honors

A degree of Doctor of Medicine with Honors may be awarded to students with high achievement who, in addition, have demonstrated initiative and success in clinical and scholarly pursuits related to medicine. Candidates for graduation with honors are nominated by the departments each year and are selected on the basis of a review of their academic records by the Honors and Awards Committee.

Graduate Medical Education and Postdoctoral Training

The University of Washington School of Medicine offers a broad array of residency and fellowship programs. Training occurs at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Puget Sound Health Care System, Children's Hospital and Regional Medical Center, and other affiliated training sites in Seattle and throughout the WWAMI region. Postdoctoral research fellowship opportunities in the basic sciences are also offered.

Continuing Medical Education

The Office of Continuing Medical Education, School of Medicine, offers a wide variety of courses for physicians and health-care professionals in the Pacific Northwest and throughout the nation.

Offerings include short courses of one to three days, one- to two-week board-review courses, visiting professorships, preceptorships, and mini-residencies. Other offerings include lecture series at hospitals, video-tape presentations, self-directed instructional materials, and other specific courses requested by members of the medical community throughout the WWAMI region. Information on offerings is available from its Web site at www.uwcmce.org.

All physicians also are invited to participate in continuing medical education programs offered by clinical departments, such as grand rounds and regular conference series.

The University of Washington School of Medicine is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. All programs sponsored by the Office of Continuing Medical Education are applicable to physician relicensure requirements of the Washington Board of Medical Examiners and for Category I credit of the Physician's Recognition Award of the American Medical Association. Prescribed credit for the American Academy of Family Physicians and other types of credit are included in the program offerings when appropriate.

Brochures and calendars for courses are available for more detailed information. For information concerning Continuing Medical Education programs, contact:

University of Washington School of Medicine
Office of Continuing Medical Education
Box 358220
1325 4th Avenue, Suite 2000
Seattle, Washington 98101-8220
Telephone: 206-543-1050 or 1-800-869-2633
Email: cme@u.washington.edu
Web site: www.uwcmce.org

Anesthesiology

BB1459 Health Sciences

The Department of Anesthesiology maintains an active program of teaching and research for both the specialist and nonspecialist. Medical students are introduced to the principles of anesthetic management and the effects of anesthetic agents on circulatory and respiratory physiology. The clinical-clerkship program provides basic training in airway management and care of the unconscious patient. A three-year residency program is available for physicians who desire specialty training in anesthesiology. In addition, advanced clinical and research training is offered in several major subspecialty areas (cardiac anesthesia, neuroanesthesia, pediatric anesthesia, obstetrical anesthesia, pain management, and regional anesthesia). Opportunities for collaborative research are available to undergraduate and graduate students. The department conducts a regular series of clinical conferences, didactic lectures, and research seminars. Questions regarding medical student clerkships may be directed to Dr. John Bramhall at 206-231-2847 or bramhall@u.washington.edu. Other training questions may be directed to the Residency Coordinator at 206-543-2773 or lfg@u.washington.edu.

Course Descriptions

See page 548.

Biological Structure

G514 Health Sciences

The department promotes an understanding of biological processes through the study and analysis of structure-function relationships. The research problems that interest members of the faculty are diverse, including cellular differentiation and development explored in a variety of biological systems, neuroscience, molecular biophysics, biomolecular structure, and quantitative biology with an emphasis on computer-graphic representations of biological structures. This diversity creates a lively atmosphere in the department that provides a stimulating environment for the training of scientists with a variety of backgrounds.

The Department of Biological Structure recruits students through interdisciplinary Ph.D. programs at the University of Washington. Faculty of the Department of Biological Structure are affiliated with one or more of these programs that provide high quality training in a wide range of scientific research areas. These multidisciplinary programs include faculty from the departments of Biochemistry, Bioengineering, Biological Structure, Botany, Environmental Health, Genetics, Immunology, Microbiology, Molecular Biotechnology, Oceanography, Pathobiology, Pathology, Pharmacology, Physiology and Biophysics, Zoology as well as research groups in the Fred Hutchinson Cancer Research Center.

Course Descriptions

See page 550.

Comparative Medicine

T142 Health Sciences

The Department of Comparative Medicine provides education and research opportunities in the use of animals in biomedical research, testing, and education. In addition, training is provided for veterinarians in the diagnosis, treatment, and prevention of the diseases of laboratory animals. Current educational programs include scheduled courses in the principles and techniques of animal experimentation (C MED 407) for biomedical graduate students, zoonotic diseases, and training in laboratory-animal medicine for veterinary medical students and veterinarians, combined with a Master of Science degree program in comparative medicine. Areas of current research interests include enteric disease, lymphocyte biology, biology of aging, mouse genomics, generation and characterization of transgenic animal models, somatic cell gene transfer, and animal models of gene therapy.

Graduate Program Coordinator
T136 Health Sciences, Box 351790
206-685-3261

Postdoctoral Program

Postdoctoral training in the areas of laboratory animal medicine and comparative pathology is offered to persons with a D.V.M. or equivalent degree. Training consists of a combination of course work, clinical residency rotations, and research leading to a Master of Science degree in comparative medicine. The program also prepares participants for specialty certification by the American College of Laboratory Animal Medicine. Financial assistance is normally provided.

A detailed description of the postdoctoral program is available on the department's Web site at depts.washington.edu/compmed/department/.

Master of Science

The Master of Science degree in comparative medicine provides advanced training in comparative medicine to veterinarians. Admission to the degree program requires acceptance into the department's Postdoctoral Training Program. The degree option involves additional elective courses, the completion of a fourth-involved research project, and a thesis.

Predocctoral Program

This program is designed to acquaint veterinary medical students with laboratory-animal medicine as a veterinary specialty. Specific areas covered include control/treatment of the principal diseases of common laboratory animals and their role in biomedical research. Blocks of four to eight weeks are available for fourth-year students year-round. Stipend support is normally provided.

Course Descriptions

See page 551.

Family Medicine

C408 Health Sciences

Family medicine is the discipline concerned with the continuing and comprehensive care of individuals and their families. The prime instructional goal of the department is the education and training of physicians who will apply the knowledge and skills of this and other medical disciplines in family practice. Implicit in this goal is the necessity for continual development of new knowledge and its application in the clinical activities of the department.

The Department of Family Medicine was founded in 1971 and is involved with instruction of medical students in several ways. These include presentations in the basic curriculum of the first two years, clinical

clerkships as part of the clinical core curriculum, and other elective courses open to all medical students. A graduate residency program in family medicine provides clinical training meeting the standards of the American Board of Family Practice and the Council on Graduate Medical Education of the American Medical Association. Active affiliations are maintained throughout the WWAMI region in predoctoral, residency, fellowship, and continuing medical education in clinical care, teaching, and research.

Course Descriptions

See page 553.

Genome Sciences

K328B Health Sciences Building

The Department of Genome Sciences was created in 2001 with the merge of the Department of Genetics and the Department of Molecular Biotechnology.

Graduate Program

Graduate Program Coordinator
K336 Health Sciences, Box 357730
206-616-7297
gensci@u.washington.edu

The Department of Genome Sciences offers a graduate program leading to the degrees of Master of Science and Doctor of Philosophy. Students are admitted only to the doctoral program and may be granted the Master of Science in lieu of the Ph.D.

The faculty and students of the Department of Genome Sciences study a broad range of topics, including the genetics of *E. coli*, yeast, *C. elegans*, *Drosophila*, and mouse; human and medical genetics; mathematical, statistical and computer methods for analyzing genomes and theoretical and evolutionary genetics; and genome-wide studies by such approaches as sequencing, transcriptional and translational analysis, polymorphism detection, and identification of protein interactions. Successful completion of the graduate program, generally over a period of five years, leads to the Ph.D. in Genome Sciences.

The department's goal is to address leading edge questions in biology and medicine by developing and applying genetic, genomic and computational approaches that take advantage of genomic information now available for humans, model organisms and a host of other species.

Doctor of Philosophy

Admission Requirements

- * Baccalaureate or advanced degree, either in a science such as biology, biochemistry, or related field, or in a computational area such as computer science or mathematics. The ideal candidate has experience in both areas. The most competitive applicants have excellent GRE scores as well as extensive laboratory research experience.
- * Personal statement describing the applicant's academic and scientific background, research goals, and motivation for applying
- * Curriculum vitae
- * Unofficial copies of transcripts.
- * Unofficial copies of GRE scores (and TOEFL scores, for international applicants). Applicants who have provided official scores to the UW Graduate School need not send additional copies.
- * Three letters of reference from professors or others who are able to provide insight on the applicant's qualifications. Reference letters may be submitted online or by hard copy.
- * Applicants still in school and who will be taking additional courses not yet listed on the transcript should send a list of additional courses to be taken before graduation.

Degree Requirements

90 credits, as follows:

- * *First year:* Core courses, covering such topics as gene regulation, genomics, genetic analysis, genomic informatics, computational biology, proteomics, and population genetics, as well as literature review.

Students rotate through a minimum of three laboratories before selecting a thesis lab at the end of the first year. Actual courses are determined in consultation with adviser.

Electives focused on specific areas of interest. Students have the option of selecting mentors from core faculty members in the Department of Genome Sciences as well as from adjunct and affiliate faculty members from several UW departments and the Fred Hutchinson Cancer Research Center.

- * *Second year:* Thesis research and additional electives. At the end of the second year, the student takes the General Exam for Ph.D. candidacy.
- * *Third year:* Students serve as teaching assistants for two undergraduate courses.
- * *Final year:* Most students complete their research and defend their dissertation during their fifth year.
- * During all years, students participate in the departmental Journal Club and Research Reports functions, and attend presentations of well-known researchers via the departmental seminar series.

Financial Aid

Genome Sciences provides full funding, including a competitive twelve-month salary, tuition waiver, and health insurance. Support is contingent upon satisfactory academic progress.

Research Facilities

The department is currently housed primarily within the J & K Wings of the Health Sciences Complex but will move in spring 2006 to the new Genome Sciences/Bioengineering building currently under construction. Students in the department are assigned space in the laboratories of faculty members with whom they do their rotations or dissertation research. State-of-the-art research facilities are available in the department for cellular, protein, and DNA analysis. Extensive computer and library resources are available to students.

Course Descriptions

See page 554.

Immunology

H564 Health Sciences

For those contemplating careers in biomedical research, immunology provides challenging and exciting intellectual opportunities. Progress in the discipline in the past decade has been extraordinary, a fact that is nowhere more visible than at the University of Washington. The Department of Immunology, launched in 1989, now boasts more than 200 scientists, students, and technicians, all engaged in elucidating mechanisms underlying immune recognition and responsiveness. Current members of the department have distinguished records in the area of lymphocyte signaling, T and B cell development, macrophage function, antigen processing, immuno-tolerance, and the structure of antigen receptors.

Consider for a moment the fundamental processes that underlie immune function. First, millions of potentially injurious macromolecules must somehow be recognized. Second, recognition of these macromolecules, generally structures associated with potential pathogens, must trigger powerful effector mechanisms that permit elimination of the offending microorganisms. Finally, these recognition and effector systems must somehow distinguish the universe of potentially harmful molecules from an equally diverse repertoire of structurally similar 'self' components. How is such exquisitely specific molecular recognition achieved? How do the cells responsible for mediating host defense develop, and what signaling systems direct their responses? These questions can now be productively addressed using biochemical, genetic, and cell biological techniques.

Graduate Program

Graduate Program Coordinator
H564 Health Sciences, Box 357650
206-685-3955, fax 206-543-1013

The Department of Immunology continues to grow and includes more than 25,000 square feet of laboratory space housed on three floors of the H and I wings of the Health Sciences Center. Joint faculty members (those holding primary appointments in other departments) have laboratory facilities in adjacent buildings. Individual laboratories are well equipped for modern biomedical research, and there are central departmental facilities for fluorescence-activated cell sorting, confocal microscopy, and the production of transgenic animals. Students have access to all the instruments and to state-of-the-art microcomputer-based data manipulation. The departmental library maintains recent copies of all major immunology journals and many more are available online or in the nearby University of Washington Health Sciences Library, which is one of the premier scientific libraries in the United States, providing access to scientific literature in all relevant disciplines.

Students are admitted for autumn quarter; the application deadline is January 1 for U.S. citizens, and November 1 for international applicants. The requirements for admission are flexible; however, most successful applicants will have completed survey courses in biology, chemistry, and physics, one year of organic chemistry, and mathematics through integral calculus. Prior exposure to immunology through formal course work or laboratory research is desirable. All immunology graduate students are assured of financial support for the term of their studies.

Master of Science

Students are not admitted to the department specifically as candidates for a master's degree. A terminal master's degree can be awarded if the faculty deems the student has made some progress in the program but not enough to be consistent with earning the Ph.D.

Doctor of Philosophy

Admission Requirements

Requirements for admission are flexible. However, most successful applicants have completed survey courses in biology, chemistry, and physics; one year of organic chemistry; and mathematics through integral calculus. Prior exposure to immunology through formal coursework, or especially through laboratory research, is desirable. A bachelor's degree is required, as is evidence of superior scholarship and above average performance on the GRE General Test. A GRE subject test is not required.

International students must take the Test of English as a Foreign Language (TOEFL); 250 is the minimum acceptable score on computer test.

Degree Requirements

90 credits, as follows:

- * 18 graded credits in the first two years of study, First-year coursework consists of consecutive 5-week long courses taken autumn through spring quarters - two per quarter; in winter quarter, all first year students also take Immunology 532 (4 graded credits), for a total of 13 or 13.5 graded credits the first year, depending on course choices (see below). In the second year, 4.5 or 5 additional graded credits are required, earned by taking electives during winter and/or spring quarters. As part of their first- and second-year coursework, students take two 5-week courses that specifically focus on cancer immunology.
- * In autumn quarter of the first year, students may take an elective and attend selected lectures of the undergraduate immunology course, IMMUN 441. Students are required to attend the departmental seminar series, Journal Club, and research -in-progress talks beginning the first quarter and continuing throughout enrollment in the program.
- * All elective courses must be relevant to biomedical research, and be rigorous enough to include either a final exam or required written paper for a grade. Elective classes must be at the 500 level, and receive a numerical grade.
- * Each graduate student takes the Qualifying Exam during July immediately following his or her second year of classes. (M.S.T.P. students take their Qualifying Exams following their first year of graduate classes.) The qualifying exam itself is two parts - written and oral.
- * Students who pass the Qualifying Exam then begin preparing for the General Exam, which must be taken within 15 months of the Qualifying Exam.
- * The dissertation must meet all format requirements before being accepted by the Graduate School.

Course Descriptions

See page 557.

Laboratory Medicine

NW 120, UW Medical Center

Medical technology, offered by the Department of Laboratory Medicine, is a profession of highly knowledgeable and skilled individuals who perform clinical laboratory tests on patient samples. This is a critical part of health care, as the results obtained by these laboratory tests are a vital tool for physicians in their diagnosis, treatment, and prevention of disease.

Undergraduate Program

Adviser
NW 120, UW Medical Center
206-598-6131
medtech@u.washington.edu

The Department of Laboratory Medicine offers the following program of study:

- * Bachelor of Science degree in Medical Technology

Bachelor of Science

1. Pre-professional Phase. During the first two years, students enroll as pre-majors in the College of Arts and Sciences, satisfying general education requirements as well as completing prerequisite courses.
2. Professional Phase. The professional phase begins autumn quarter of the third year and continues for seven consecutive quarters at the UW School of Medicine. Courses in the first year of the professional phase provide students an appropriate theoretical background and basic technical skills that enable them to function effectively in the clinical laboratory.

The final year is offered in the clinical laboratories of the UW Medical Center and its principal affiliates. Students in the core clinical laboratories receive on-the-bench training in chemistry, hematology, immunohematology, and microbiology.

Suggested First- and Second-Year College Work: Completion of University writing, reasoning, and general education requirements. Electives, not required for admission or graduation, may include: CHEM 321, MICROM 301, GENET 351, 371, B STR 301, PHIL 115, PHIL 241, CLAS 101, CLAS 205, PATH 410, UCONJ 420. Begin taking admission requirements, shown below.

Department Admission Requirements

BIOL 180, BIOL 200 and BIOL 220; CHEM 142, CHEM 152 and CHEM 162; CHEM 223 and CHEM 224 (or CHEM 237, CHEM 238 and CHEM 239); MATH 124 or MATH 144 or STAT 220. BIOL 118 is recommended, but not required.

Complete all general education requirements including 10 credits of Individuals & Societies, and 10 credits of Visual, Literary, & Performing Arts, as well as all required English and writing courses.

Students admitted to the Medical Technology program must be exempt from or have successfully completed any required English as a Second Language (ESL) courses no later than August 31 of the application year or admission will be cancelled.

Application Procedure: See program adviser for application form. Application deadline is February 15, to begin the following autumn quarter.

Major requirements

142-146 credits as follows:

1. Courses Required for Admission (44-47 credits): See list above.
2. Didactic Courses (52-53 credits): BIOC 405, BIOC 406; MICROM 440, MICROM 441, MICROM 442, MICROM 443, MICROM 444, MICROM

445; LAB M 321, LAB M 322, LAB M 418, LAB M 419, LAB M 420, LAB M 421.

3. Clinical Rotations (46 credits): LAB M 423, LAB M 424, LAB M 425, LAB M 426, LAB M 427.

4. A minimum grade of 2.0 in all LAB M courses and a minimum GPA of 2.00, both cumulative and in required courses, are required for graduation.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* Graduates of the Medical Technology Program are expected to have in-depth knowledge of the relationships between laboratory data and pathologic processes, and how laboratory data relate to clinical medicine. They have experience with the performance and quality control of routine and specialized medical laboratory testing procedures and an understanding of the theoretical basis of these procedures. In addition, they have experience trouble-shooting and resolving typical problems in the clinical laboratory and are familiar with laboratory quality assurance, safety, governmental regulations, information systems, management, research design and practice, educational methodology, continuing education, communication, ethics, professionalism, and concepts and principles of laboratory operations.

Successful medical technologists enjoy studying the biological, chemical, and physical sciences and find personal satisfaction and intellectual reward in applying scientific methods in the diagnosis and evaluation of disease. A medical technologist may practice as a generalist, using knowledge in several of the scientific areas, or may specialize in one scientific area in larger hospitals. Medical technologists may work in a variety of settings, including clinical laboratories in large medical centers, hospitals, and clinics. Others carry out research in industrial, public health, and medical laboratories, or teach in hospitals, colleges, and universities.

* *Instructional and Research Facilities:* The major training sites are the University of Washington Medical Center and Harborview Medical Center. Affiliate hospitals include Children's Hospital and Regional Medical Center, Dynacare Northwest, Group Health Cooperative, MultiCare Health System, Northwest Hospital, Providence Everett Medical Center, Providence St. Peter Hospital, Veterans' Affairs Puget Sound Health Care System, and Virginia Mason Medical Center. The Puget Sound Blood Center is also affiliated with the University of Washington. These laboratories support patient care, and provide training and research in the major clinical divisions of chemistry, hematology, immunohematology (blood banking), and microbiology, including multiple subspecialties in these divisions. In addition, students can either receive training in a variety of clinical laboratory rotations designed to enrich their core clinical experiences or participate in research in collaborative projects supervised by faculty members in the Department of Laboratory Medicine. Enrichment rotations include subspecialty sections in chemistry, hematology, and/or microbiology; molecular diagnostics laboratories; and laboratories where multi-tasking skills are utilized.

* *Honors Options Available:* None offered

* *Internship Opportunities:* One or two internships per year in Japan available to graduates of the Medical Technology Program.

* *Department Scholarships:* None offered.

* *Student Organizations/Associations:* None currently active.

Of Special Note: The Medical Technology Program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences, 8410 W. Bryn Mawr Avenue, #670, Chicago, Illinois 60631-3415, (312) 714-8880. Graduates are eligible for certification by the Board of Registry of the American Society for Clinical Pathology and by the National Credentialing Agency for Laboratory Personnel, Inc.

Course Descriptions

See page 558.

Medical Education and Biomedical Informatics

E312 Health Sciences

The Department of Medical Education and Biomedical Informatics (MEBI) is comprised of three units: the Division of General Medical Education, the Division of Biomedical and Health Informatics, and MEDEX Northwest—the Division of Physician Assistant Studies. The Division of General Medical Education serves the medical school and health sciences community through program support, evaluation, and research in the field of medical education (www.mebi.washington.edu). The Division of Biomedical and Health Informatics consists of a research and training program that emphasizes both basic and applied aspects of informatics with a view toward making a difference in people's lives through interdisciplinary collaboration between faculty and students (www.bhi.washington.edu). MEDEX Northwest is a regional program that selects experienced health care providers for training as physician assistants and is dedicated to improving access to medical care and emphasizes delivery of health care services to medically underserved populations in the Northwest (www.medex.washington.edu).

The Department of Medical Education and Biomedical Informatics offers courses in the theory and application of medical education and biomedical and health informatics. Courses are designed for faculty, graduate and undergraduate students, postgraduates and fellows in the health sciences who desire further training in the methods, issues, research, and technology of medical education and biomedical informatics. MEBI offers masters and doctoral degrees, as well as certificates and fellowship training, in biomedical and health informatics. MEDEX Northwest offers a program of study leading to a certificate with an optional degree available (a Bachelor of Clinical Health Services). MEDEX also offers an optional masters degree pathway link with the Extended Degree Program in Public Health. MEDEX provides full-time training in three sites (Seattle, Spokane, and Yakima) and offers part-time training in Seattle and Spokane.

Graduate Program

Graduate Program Coordinator
E312 Health Sciences, Box 357240
(206) 221-6859

Master of Science

Admission Requirements

- * Possession of a baccalaureate degree from an institution within the United States or an equivalent degree from a recognized college or university from outside the United States.
- * A minimum undergraduate grade point average of 3.00, for the last 90 graded quarter credits or 60 graded semester credits.
- * Prior formal college-level coursework, verified by official transcripts, in mathematics (including statistics), computer programming (at least two quarters), and biology (or zoology), as evidenced by official transcripts.
- * GRE scores are required unless the applicant holds an earned doctorate (such as Ph.D., D.D.S., M.D., Ed.D., J.D.) from an accredited U.S. institution. The GRE scores must be from testing within the past five years.
- * GRE scores are required for all international applicants, including holders of foreign doctorates (such as Ph.D., D.D.S., M.D., Ed.D., J.D.).
- * A test of English language proficiency (usually the TOEFL) is also required for most all international applicants, unless they have an earned undergraduate or graduate degree from an accredited U.S. institution. For the TOEFL a minimum score of 600 (paper-based) or 250 (computerized) is required, and the scores must be from a test taken within the past two years.

Degree Requirements

60 credits, as follows:

- * Foundational courses: MEBI 530 (3), MEBI 550 (3), MEBI 552 (3); either LIS 510 (4) or LIS 544 (3); two of the following courses: MEBI 534 (3), MEBI 535 (3), HSERV 503/EPI 503 (3);*a graduate-level statistics class
- * Elective courses: In addition to the foundational courses, all M.S. students must take four additional courses to establish depth of knowledge in their chosen area of specialization. These must be approved by the student's academic advisor.

- * Research seminars: At least 3 credits of MEBI 591 and at least 3 credits of MEBI 590
- * Thesis and final exam: All students must complete an M.S. thesis and pass a final exam for the Master's degree.

Doctor of Philosophy

Admission Requirements

- * Possession of a baccalaureate degree from an institution within the United States or an equivalent degree from a recognized college or university from outside the United States.
- * A minimum undergraduate grade point average of 3.00, for the last 90 graded quarter credits or 60 graded semester credits.
- * Prior formal college-level coursework, verified by official transcripts, in mathematics (including statistics), computer programming (at least two quarters), and biology (or zoology), as evidenced by official transcripts.
- * GRE scores are required unless the applicant holds an earned doctorate (such as Ph.D., D.D.S., M.D., Ed.D., J.D.) from an accredited U.S. institution. The GRE scores must be from testing within the past five years.
- * GRE scores are required for all international applicants, including holders of foreign doctorates (such as Ph.D., D.D.S., M.D., Ed.D., J.D.).
- * A test of English language proficiency (usually the TOEFL) is also required for most all international applicants, unless they have an earned undergraduate or graduate degree from an accredited U.S. institution. For the TOEFL a minimum score of 600 (paper-based) or 250 (computerized) is required, and the scores must be from a test taken within the past two years.

Degree Requirements

90 credits, as follows:

- * Foundational courses: MEBI 520 (2), MEBI 530 (3), MEBI 550 (3), MEBI 552 (3); either LIS 510 (4) or LIS 544 (3); two of the following: MEBI 534 (3), MEBI 535 (3), HSERV 503/EPI 503 (3); a graduate level statistics class
- * Courses for depth of knowledge: In addition to the foundational courses, all Ph.D. students must take five additional courses to establish the necessary depth of knowledge in their chosen area of specialization. These must be approved by the student's academic advisor.
- * Research seminars: 12 credits of research seminars that must include at least 6 credits of MEBI 591 and at least 3 credits of MEBI 590
- * Oral presentations: All students must satisfactorily present material in an oral format. Students should present at least once per year. This requirement is expected to be fulfilled by journal club and research seminar (MEBI 590 and MEBI 591) presentations.
- * Formal exams:
 - o The Qualifying Exam: All students must pass a qualifying exam (oral and written) that covers breadth of knowledge prior to formally creating a Ph.D. supervisory committee and proceeding with their dissertation research.
 - o The General Exam: The general exam includes an oral and written part. The oral portion is a public presentation of the student's area of research, and includes an oral exam covering the student's in-depth knowledge of their area.
 - o Final Exam (dissertation defense): A candidate for the Ph.D. must present a dissertation demonstrating original and independent investigation and significant achievement in the field of Biomedical and Health Informatics.

Course Descriptions

See page 560.

Medical History and Ethics

A204 Health Sciences Building

Undergraduate Program

Adviser
A204 Health Sciences Building, Box 357120
206-543-5145
mheinfo@u.washington.edu

The Department of Medical History and Ethics offers the following programs of study:

* A minor in medical history and ethics

Minor

Minor Requirements: 25 credits of medical history and ethics and related courses, including MHE 401 or MHE 417; one of MHE 411, MHE 474, PHIL 240, or PHIL 242; plus an additional 14 credits selected from MHE 402/PHIL 342, MHE 413, MHE 422, MHE 424, MHE 440/PHIL 459, MHE 474/PHIL 411, MHE 481, MHE 483, MHE 485, MHE 497, MHE 498, MHE 499, ANTH 322/RELIG 320, ANTH 375, ANTH/HSERV 475, ANTH 476, 477, ENGL 364, GEOG 280, HIST 311, HIST 312, PHIL 102, PHIL 160, PHIL 345, PHIL 410, and PHIL 440. Minimum grade of 2.0 required in each course presented for the minor. See the department's Web site for periodic updates of acceptable electives.

Course Descriptions

See page 561.

Medicine

RR512 University of Washington Medical Center

domchair@u.washington.edu

Active programs in teaching, research, and patient care are carried on at the University of Washington Medical Center, Veteran's Administration Puget Sound Health Care System (VAPSHCS), Harborview Medical Center, Pacific Medical Center, the Puget Sound Blood Center, the Northwest Kidney Center, and the Fred Hutchinson Cancer Research Center. Major affiliations for clinical teaching also exist with Providence Medical Center and Swedish Hospital Medical Center. There are many additional affiliations with community hospitals in Seattle, the state of Washington, and the WWAMI region. Medical students, interns, medical residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

Course Descriptions

See page 562.

Microbiology

G315 Health Sciences

Microbiology is a natural science that deals with microorganisms such as bacteria, fungi, protozoa, algae, and viruses. It is concerned with the nature and properties of these organisms, their effects on humans and the environment, and how they can be exploited to provide useful products.

Undergraduate Program

The Bachelor of Science in microbiology is granted by the College of Arts and Sciences. For a description of the undergraduate program in microbiology, see College of Arts and Sciences section.

Graduate Program

Graduate Program Coordinator
G315 Health Sciences, Box 357242
206-543-2572
advmicro@u.washington.edu

The Department of Microbiology offers a graduate program leading to the Doctor of Philosophy degree. Students interested in graduate work should obtain the necessary application forms from the department.

Admission Requirements

Students can be admitted to the Ph.D. program with a background in any biological science discipline. Selection is based on the evaluation of a

student's undergraduate record for indications of the ability to excel in independent, creative research. The department strongly recommends that undergraduate preparation include courses in biochemistry, physics, general and organic chemistry, microbiology, molecular biology and cell biology. To be competitive with the applicant pool, prospective students are also strongly advised to seek opportunities to carry out undergraduate research.

Required background courses (generally satisfied prior to entry into the graduate program):

- * A one year course in biochemistry (equivalent to BIOC 440, 441, and 442)
- * A course in classical and molecular genetics (equivalent to GENOME 371 or 372)
- * A course in general microbiology (equivalent to MICROM 410)
- * A course in medical microbiology and basic immunology is recommended for those considering research in the area of medical microbiology or virology

Degree Requirements

90 credits minimum, as follows:

- * Conjoint courses (6 credits): 6 credits from the following conjoint courses: CONJ 524, CONJ 531, CONJ 532, CONJ 533, CONJ 534, CONJ 535, CONJ 537, CONJ 538, CONJ 539, CONJ 541, CONJ 543, CONJ 544, CONJ 545, CONJ 546, CONJ 547, CONJ 548, CONJ 549 (1.5 credits each). It is recommended that students take additional conjoint courses or choose one or more of the Genome Sciences modules: GENOME 551, GENOME 552, GENOME 553, GENOME 554, GENOME 555, GENOME 556, GENOME 559 (1.5 credits each).
- * Virology and Bacteriology courses (6-7 credits): Three of the following courses; one virology and one bacteriology course must be among those selected: MCB 532 (3), MCB 542 (3), MICROM 441 (4), MICROM 450 (3), MICROM 510 (3), MICROM 530 (3), MICROM 553 (3)
- * Faculty Research Presentations for first-year students: MICROM 599 (2)
- * Lab Rotation: MICROM 500, minimum of three quarters
- * Journal Club: MICROM 522, continuous enrollment
- * Seminar: Microbiology 520 seminar series or attendance at Fred Hutchinson seminars. Students at Fred Hutchinson are also encouraged to attend the Microbiology seminars. To be taken every quarter unless a conflict with teaching exists.
- * Research Discussion Groups: To be taken every quarter. Students should register for the appropriate course number for credit.
- * Additional requirements:
 - o Teaching assistantship in at least two lab courses for undergraduates (usually satisfied in the first and/or second year).
 - o Give at least two formal lectures in an undergraduate course (third or fourth year).
 - o Be first author on multiple papers related to thesis research which are published or accepted for publication in refereed journals. Under some circumstances, one first-author publication would satisfy this requirement.
- * General exam, dissertation, final exam

Course Descriptions

See page 564.

Neurological Surgery

700 9th Avenue, Harborview Medical Center

askuwns@u.washington.edu

The Department of Neurological Surgery is dedicated to teaching and research in the entire spectrum of diseases of the central and peripheral nervous system. Instruction in this area is provided for medical students and postgraduate physicians.

The department's medical-student instruction includes participation in the human-biology curriculum as well as in elective basic-science and clinical experiences. These are available at Harborview Medical Center, University of Washington Medical Center, Veterans Affairs Puget Sound Health Care Center, and Children's Hospital and Regional Medical Center. The department also has several course offerings correlating research and clinical problems of the nervous system, including the research seminars in

neuro-oncology, molecular imaging, stem cell biology, and clinical and basic-science correlates of the epilepsies.

Selected medical students also may elect research experience within the Department of Neurological Surgery. The department research facilities are housed in the Medical Research Tower of the University of Washington Medical Center, at Harborview Research and Training Building, and at Veterans Affairs Puget Sound Health Care System. Investigations are under way at these institutions in many areas of molecular biology, stem cell biology, neurophysiology, brain function and epilepsy research, neuroanatomy, nanotechnology, molecular imaging, behavioral research, outcomes research (cranial and spine), trauma research, and neuro-oncology.

In addition to undergraduate instruction, a fully certified residency program in neurological surgery is available for selected postgraduate physicians. The eight-year program emphasizes preparation for a career in academic neurosurgery.

Course Descriptions

See page 566.

Neurology

RR650 University of Washington Medical Center
neurolog@u.washington.edu

Neurology, previously a division of the Department of Medicine, became an independent department at the University of Washington School of Medicine in autumn of 1995. The four-year residency program (including an internship) offers superb training in all facets of neurology in a setting of great institutional strength in fundamental neuroscience research. In addition, the Department of Neurology offers exceptional training programs in the Divisions of Neurogenetics and Pediatric Neurology and in the Epilepsy Center. A clinical-clerkship program provides basic training in neurology patient care. The Neurology Department is active in teaching, research, and patient care at the University of Washington Medical Center, Seattle Veterans Affairs Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, and the Fred Hutchinson Cancer Research Center. Medical students, interns, neurology residents, and postdoctoral research fellows rotate through these various hospitals and participate in the learning experiences offered at each.

Course Descriptions

See page 566.

Obstetrics and Gynecology

BB617 Health Sciences Building

The Department of Obstetrics and Gynecology is involved with teaching, patient care, and research in the areas of normal and abnormal human reproduction: growth and development of the fetus, normal and complicated obstetrics, and surgical and medical diseases of the female reproductive system, including endocrinology, oncology, infectious disease, urogynecology, psychosocial problems, primary and preventive health care, and ethics.

Course Descriptions

See page 566.

Ophthalmology

RR801 University of Washington Medical Center

The Department of Ophthalmology is responsible for the instructional and research programs in diseases of the eye and visual system and its adnexae.

Medical-student instruction is provided, including multiple electives in the clinical years. Graduate physicians are provided with three years of residency training at the affiliated hospitals. An optional internship is available in ophthalmology. A two-year ophthalmic plastics and orbit fellowship, and a two-year surgical retina fellowship are offered. Patient care is provided under the supervision of full- and part-time faculty physicians at the University of Washington Medical Center, Harborview Medical Center, Veterans Affairs Medical Center, and Children's Hospital and Regional Medical Center.

Clinical research programs relate to eye diseases. Laboratory research encompasses neurophysiology of vision, morphology of the retina and visual system, corneal wound healing, biochemistry of ocular tissues, and anatomy/physiology of the orbit. Postdoctoral training is offered in all these disciplines.

For more information on residencies and fellowships, contact Ingrid Noe at ingrid@u.washington.edu. For more information on medical student clerkships, contact Dorrie Quirante at dorrieq@u.washington.edu.

Course Descriptions

See page 567.

Orthopaedics

BB1043 University of Washington Medical Center

The Department of Orthopaedics is actively involved in quality patient care, teaching, and research concerning bone and joint problems. Special areas of expertise include foot and ankle, hand and microvascular, hip and knee, arthritis, sports medicine, pediatric orthopaedics, shoulder and elbow, spine, trauma, and tumors.

In addition to providing instruction for medical students, the department provides education at the graduate, residency, and post-residency levels. Selected medical students may elect research experience in the department. A fully approved residency offers opportunities to carry out fundamental and clinical research. Residents may work toward the Master of Science degree by meeting the requirements of the Graduate School and the academic unit offering the degree program.

Course Descriptions

See page 568.

Otolaryngology -- Head and Neck Surgery

BB1165 University of Washington Medical Center

The Department of Otolaryngology -- Head and Neck Surgery provides clinical care for patients with a broad spectrum of disorders affecting the head and neck region, including the ears, nose, and throat. A major portion of departmental effort is directed toward basic research in the areas of sensorineural hearing disorders, physiology of the larynx, and cancer treatment and rehabilitation. The department supports a number of research fellows and advanced degree candidates, and is responsible for a four-year residency program and for the training of medical students in subjects relevant to the specialty.

Course Descriptions

See page 568.

Pathology

C516 Health Sciences

Pathology is the study of disease; its causes, mechanisms, and effects on the body. Pathology is both a basic biological science and a specialty of medicine. As a medical specialty, practiced by M.D.s, it includes the

laboratory evaluation of organs, tissues and fluids to assist other physicians in reaching a diagnosis. As a basic science, practiced by Ph.D.s, pathology focuses on the experimental investigation of the molecular processes of disease, using techniques of cell and organ culture, biochemistry, molecular biology, and genetics.

Graduate Program

Graduate Program Coordinator
C516 Health Sciences, Box 357470
206-616-7551

The Department of Pathology offers graduate training in experimental pathology, with an emphasis on the cellular and molecular biological basis of disease, leading to the Doctor of Philosophy degree in cellular and molecular pathology. The primary goal of the graduate program is to train individuals for careers as practicing scientists in biomedical research, investigating basic disease mechanisms. The emphasis of the program is on development of skills in hypothesis generation and testing, including the design, accomplishment and critical interpretation of experiments. Experimental pathology uses the full range of biomedical research techniques (including biochemistry, molecular biology, cell biology, animal modeling) to attempt to elucidate the mechanisms underlying human disease. Graduates of the program usually continue research careers at biotechnology companies or universities/research institutes.

Doctor of Philosophy

Admission Requirements

- * Copy of the Graduate School Application
- * Official transcripts
- * Official GRE scores. The department also recommend that applicants take the Subject Test in Biology or related area.
- * Statement of purpose and research interests
- * Three or more letters of recommendation
- * Personal statement that addresses the relationship between personal background and aspirations

Special Requirements

Prospective candidates should have taken undergraduate courses in the sciences, and have acceptable scores on the Graduate Record Examination, including advanced biology or chemistry. Some experience in a research laboratory is strongly recommended. Those wishing to matriculate toward both the M.D. and Ph.D. degrees must gain admission to both the Graduate School and the School of Medicine.

Degree Requirements

90 credits as follows:

- * Required coursework: PATH 500 (3), PATH 501 (1), PATH 507 (2), PATH 512 (1.5), PATH 513 (1.5), PATH 515 (1.5), PATH 516 (3), PATH 520 (1), PATH 551 (2-5); B10ST 511 (4); CONJ 538 (1/1.5), CONJ 539 (1.5)
- * Research before the General Exam: PATH 600
- * Research after the General Exam: PATH 800
- * Recommended courses: CONJ 531 (1.5), CONJ 532 (1.5)
- * General Examination
- * Dissertation
- * Final Examination

Financial Aid

Funding for students is provided from departmental and University funds, training grants, a variety of institutional fellowships, and research grants of individual faculty members.

Research Facilities

The department emphasizes the cellular and molecular approach to the investigation of the pathogenesis of disease in mammalian species. Special facilities exist for training in electron microscopy; cell, tissue, and organ culture; recombinant DNA techniques; histochemistry and cytochemistry; analytical biochemistry; immunology; and molecular and cell biology. Residency Training Program

The department supervises a residency-training program in anatomic pathology and, jointly with the Department of Laboratory Medicine, in clinical pathology for qualified medical doctors. Subspecialty training is also

available through clinical fellowships. Persons who complete the residency program are eligible for certification by the American Board of Pathology. For additional information, contact the Resident Program Director, Department of Pathology, Box 356100 or visit the Residency Program Web site.

Course Descriptions

See page 569.

Pediatrics

RR314 Health Sciences

Pediatrics involves the study of physical and behavioral development of humans, in health and disease, from conception to adulthood.

Instruction is provided through conjoint courses, lectures, conferences, clerkships, and electives. Faculty members participate in teaching the basic curriculum and offer 24 electives, including the general pediatrics clerkship at multiple WWAMI sites. A residency program is offered with a wide variety of electives in addition to traditional hospital-inpatient and clinic experience. Postdoctoral fellowship training is available in many subspecialty areas of pediatrics. The major teaching hospitals in Seattle are Children's Hospital and Regional Medical Center, University of Washington Medical Center, and Harborview Medical Center.

Course Descriptions

See page 571.

Pharmacology

E401 Health Sciences

Pharmacology is the science that deals with the nature of interactions between drugs and biological systems, and with the applications of such interactions to the treatment of disease. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

Graduate Program

Graduate Program Coordinator
E-417 Health Sciences, Box 357280
206-543-9280
phcoladm@u.washington.edu

The Department of Pharmacology offers the Doctor of Philosophy degree.

Doctor of Philosophy

Admission Requirement

A baccalaureate degree with a major in any of the sciences, such as biochemistry, chemistry, pharmacy, physics, physiology, psychology, or zoology. Students are selected from the applicant pool based on several criteria, including academic records, recommendations, and previous research experience.

Degree Requirements

PHCOL 510, PHCOL 511, PHCOL 512, and PHCOL 513 (2 credits each) with a grade of 2.7 or above for each class. Enrollment in PHCOL 507 throughout graduate school. PHCOL 514 in the first, second, and third years of graduate study.

PHCOL 519 (laboratory rotations) for autumn, winter, and spring quarters of the first year with the purpose of acquainting the student with various areas of pharmacology and research under investigation within the department. During each quarter, the student carries out a research project in the laboratory of a faculty member. At the end of the quarter, the student gives a presentation on the rotation research project that is evaluated by the faculty, using the criteria of scientific content, delivery, knowledge of the subject, and organization of material. The student receives a grade and academic credit for PHCOL 519. Students entering into the Ph.D. program

with an M.S. degree or equivalent may petition to be allowed to enroll in only one quarter of PHCOL 519 before selecting a lab. Rotations may occur outside the department by special permission only.

Four advanced 2-3 credit graded elective courses in pharmacology in addition to the 510-513 series are required. Nine graded credits (non-seminar) in graduate-level courses in physiology, biochemistry, molecular biology, immunology, cell biology, or other relevant areas are required. The courses should strengthen the foundation of the student's thesis proposal.

Creditable passage of a comprehensive written exam on general pharmacology, to be taken during the summer quarter of the second year, is required. During the first quarter of the third year of study, students take the oral General Exam. This examination is given by the Supervisory Committee. The examination is based in part on an evaluation of the student's proposed research for the dissertation and on his or her knowledge of the major disciplines important to the research. As a result of the examination, the Committee may recommend termination, further work and subsequent reexamination, or approval of the student's performance and candidacy for the Ph.D. degree.

After successful completion of the General Exam, the student devotes most of his or her time to thesis research in the third and subsequent years of study.

The research project for the Ph.D. dissertation is chosen by the candidate and faculty sponsor and approved by the candidate's Supervisory Committee. The research must represent a worthy and fundamental contribution showing originality in concept and implementation.

When the candidate has concluded the research project and prepared a complete copy of the dissertation, the sponsor will obtain approval of the Graduate School and set a date for the Final Examination. The Final Examination is concerned principally with the subject matter of the dissertation, but may include the background and origins of the dissertation problem as well as its practical applications and extrapolations.

Financial Aid

Financial support is offered to students who maintain satisfactory academic progress. Tuition and stipends are provided by National Institutes of Health training grants, University of Washington teaching assistantships, individual research grants, and fellowships from private sources.

Course Descriptions

See page 572.

Physiology and Biophysics

G424 Health Sciences

Physiology deals with the processes, activities, and phenomena incidental to, and characteristic of, life and living organisms. Based upon physics, chemistry, and mathematics, physiology interlocks closely with the other basic medical sciences—anatomy, molecular biology, immunology, biochemistry, pharmacology, and pathology—and with psychology. Research in physiology is accomplished by analyzing the molecular, cellular, and integrative properties of the system under study. For this reason, physiology appeals to students with diverse backgrounds and goals. Courses in this field are given for medical, dental, pharmacy, nursing, and graduate students.

Graduate Program

Graduate Program Coordinator
G424 Health Sciences, Box 357290
206-685-0519
pbio@u.washington.edu

The Department of Physiology and Biophysics offers advanced instruction and training leading to both the Master of Science and Doctor of Philosophy degrees. Students aspiring only to the M.S. degree are rarely accepted. Students pursuing a Ph.D. degree in physiology and biophysics may emphasize molecular and cellular physiology, biophysics, neurobiology, respiratory physiology, or endocrinology. Studies leading to the doctoral degree require five to six years to complete. The first year is spent acquiring a broad knowledge of physiology via a sequence of courses and laboratory

rotations. After selection of a special area of study, the second year is spent taking advanced seminars in the area of specialization and developing a thesis proposal. After admission to candidacy, the latter years are spent pursuing the area in depth and completing an original-research project.

Individuals with graduate degrees in physiology and biophysics often pursue careers in teaching and research in colleges and universities and in biotech industries. With additional training, graduates have been successful in medicine, law, creative writing, and high-level computer programming.

The department participates in interdisciplinary Ph.D. degree programs in Neurobiology and Behavior, and in Molecular and Cellular Biology.

Master of Science

The Master of Science degree is normally granted as part of the path of study leading to the Doctor of Philosophy degree. Students are normally admitted only to the Doctor of Philosophy degree.

Doctor of Philosophy

Admission Requirements

To apply for admission, a student must provide academic transcripts, Graduate Record Examination (GRE) scores, four letters of recommendation, and a statement of purpose. Because of the broad scope and interdisciplinary nature of our graduate program, we have no specific prerequisites for admission. However, most of our students have backgrounds in the physical and/or biological sciences. These include majors in biology, physics, mathematics, engineering, computer science, chemistry, and psychology. The most important requirement is a strong motivation and excitement about doing science.

Degree Requirements

90 credits minimum, as follows:

Due to the broad nature of the research interests in the department and the diversity of backgrounds of our graduate students, formal course requirements are kept to a minimum and are completed in the first year. Students are encouraged to shape their own graduate education, as they choose the majority of their coursework and the scientific direction for their research. The courses available include those offered by other departments, both in the Medical School and elsewhere on campus. Electives may be chosen from a list of mini-courses whose topics reflect the current interests of faculty and students. Students are required to take at least 6 mini courses; 15 mini courses are currently offered with additional courses being added each quarter.

Required Courses:

- * CONJ 531 (1.5)
- * CONJ 532 (1.5)
- * P BIO 532 (2)
- * NEUBEH 501, NEUBEH 502 (3, 3)
- * P BIO 508 (2-5, max. 5, must be taken three times)
- * P BIO 519 (1)
- * Six departmental mini-courses to be completed prior to the General Exam, taken from the following: P BIO 509 (3), P BIO 545 (3), P BIO 550 (1), P BIO 551 (1), P BIO 552 (1), P BIO 553 (2), P BIO 554 (1), P BIO 555 (1), P BIO 556 (1), P BIO 557 (1), P BIO 559 (3)
- * P BIO 513 (4)
- * P BIO 600 (before General Exam)
- * P BIO 800 (after General Exam)
- * *Note:* P BIO 503 (4) is highly recommended, but not required

General Exam

The General Exam must be taken by the last day of autumn quarter of the third year. After passing the General Exam the student is advanced to candidacy for the doctoral degree. The student then registers for P BIO 800 and continue working on thesis research.

Final Exam

The culmination of the program is the submission of a written doctoral thesis and the presentation of this work in a public lecture attended by members of the department and the University.

Research Facilities

The department is well equipped to provide instruction and research training in cellular and molecular physiology, neurobiology, membrane biophysics, respiratory physiology, muscle biophysics, endocrinology, reproduction, and physiological psychology. The facilities of the Regional Primate Research Center, adjacent to the department, are available to qualified trainees who need to use primates in their research.

Course Descriptions

See page 573.

Psychiatry and Behavioral Sciences

BB1644 Health Sciences

pbsci@u.washington.edu

The department offers course work, clinical training, and research opportunities for undergraduate students, medical students, graduate physicians, and graduate students in allied health programs such as psychology, social work, and psychiatric nursing.

A biobehavioral approach is emphasized, which incorporates intrapersonal, interpersonal, and sociocultural factors. Intrapersonal factors include emotion, perception, cognition, psychodynamics, neurochemistry, neuroanatomy, neurophysiology, genetics, and the developmental and aging processes. Interpersonal factors focus upon dyadic, familial, and group interactions. Sociocultural factors include the cultural, social, institutional, and community systems as well as the environment and epidemiology of health and disease.

Graduate Program

The medical school curriculum is divided into a core (basic) curriculum and an elective curriculum. Within its core curriculum the Department of Psychiatry and Behavioral Sciences offers material covering learning theory, cognition, memory, perception, neuropharmacology, social growth and development, epidemiology of health and disease, psychopathology, psychotherapy, and neuropsychiatry and behavioral medicine, as well as training in interviewing skills and assessment techniques. Its elective program includes a variety of clinical experiences and advanced didactics and seminars designed to further the knowledge and skills developed within the basic curriculum. In addition, the department encourages research and other scholarly pursuits by students in areas of interest to them. Stipends are available for research studies.

Residency Training in Psychiatry

Contact: Deborah Cowley

A four-year residency for medical school graduates and a three-year post-internship residency prepares physicians for Specialty Board Certification in Psychiatry. Clinical rotations on inpatient, outpatient, emergency, and consultation/liaison services are augmented by individual supervision and didactic lectures. With the program's integrative orientation, residents become proficient in psychotherapy, psychopharmacology, and community liaison with patients of all ages. Fellowships in child, geriatric, addiction, community, forensic and consultation-liaison psychiatry, and psychiatric neuroscience are available.

Clinical Psychology Internship Program

Contact: Joan Romano

The one-year internship in clinical psychology, accredited by the American Psychological Association, offers advanced clinical training to candidates for the doctorate in clinical psychology from graduate programs accredited by the American Psychological Association. Training tracks with the internship in general adult, general child, rehabilitation and health psychology, and public behavioral health and justice policy (adult and child). Advanced research skills training is also available as part of an INH-funded training grant for selected internship participants.

Postdoctoral Fellowship Training

Contact: Richard Veith

Postdoctoral fellowships for advanced clinical and research training in behavioral medicine, broadly construed, are also offered.

Course Descriptions

See page 575.

Radiation Oncology

NN106 University of Washington Medical Center

Radiation oncology is the branch of clinical medicine that utilizes high-energy radiation to treat disease, usually cancer. The department consists of three divisions: clinical radiation oncology, medical radiation physics, and experimental cancer biology. Training programs are offered in all three divisions. Research programs in the Department of Radiation Oncology are aimed at the physical and biological mechanisms of interactions between ionizing radiations, and normal and malignant tissues, with particular emphasis on high linear energy transfer (LET) radiation effects. The department is actively involved in radiation treatment planning work particularly in regard to intensity modulated radiation therapy (IMRT). Other programs involve the application of positron emission tomography (PET) to elucidate differences between cancers and normal tissues, and the development of specialized radiopharmaceuticals.

Course Descriptions

See page 576.

Radiology

RR215 University of Washington Medical Center

Diagnostic radiology is that branch of clinical medicine that specializes in the interpretation of various imaging modalities in order to detect, to characterize, and (with increasing frequency) to treat a wide variety of diseases. Historically, x-rays were the first energy source utilized for these purposes, and they continue to be a mainstay of this discipline. More recently, the armamentarium has grown to include ultrasound, computed tomography, magnetic resonance, and positron-emission tomography. In nuclear medicine, one of radiology's major subspecialties, radionuclides are employed for both diagnostic and therapeutic purposes. Another subspecialty is interventional radiology, wherein aspirations and biopsies, as well as therapeutic procedures such as abscess drainage, tumor embolization, and vascular stents are performed percutaneously.

The Department of Radiology consists of two clinical divisions: diagnostic radiology and nuclear medicine. Both divisions are ably supported by technologists and faculty members in the field of radiation physics. Instruction in radiology is provided for medical students, residents, and fellows as well as for other physicians. The faculty and its teaching and research activities are represented in each of the hospitals affiliated with the University.

Course Descriptions

See page 576.

Rehabilitation Medicine

BB919 Health Sciences

The Department of Rehabilitation Medicine provides education for medical students, interns, residents, and allied health students in occupational therapy, physical therapy, and prosthetics and orthotics in a comprehensive approach to rehabilitation problems. This includes special diagnostic and evaluative procedures; methods and rationale in the application of principles of occupational therapy, physical therapy, prosthetics and orthotics, and other health professions; and advanced investigation of special problems

encountered in the field. In addition, the department conducts a residency training program for the specialty of physical medicine and rehabilitation.

The department offers curricula leading to the following degrees: Master of Occupational Therapy, Doctor of Physical Therapy, and a Bachelor of Science in the field of prosthetics and orthotics. The department also offers a Master of Science degree in rehabilitation medicine with options for occupational therapists, physical therapists, and residents in physical medicine and rehabilitation who wish to pursue academic or research careers.

Occupational Therapy

Head

Elizabeth M. Kanny

Occupational therapists provide services related to occupational performance in everyday life in the areas of self-care, work and productive activities, and play/leisure. Occupational therapists work with people who have physical illness or injury, social or emotional difficulties, congenital or developmental problems, or who are in need of preventive strategies that promote well being. They work with people in all age groups from diverse cultural and ethnic groups and socioeconomic levels.

Occupational therapists help people with impairments or limitations to live as productive a life as possible. They work with people to increase independent function in life activities, enhance development, and to minimize or prevent disability. They use a variety of therapeutic methods including training in self-care activities; design, fabrication, and application of splints; sensorimotor activities; therapeutic group activities; selection and use of adaptive equipment; adaptation of physical environments in the home, school, work, or community; activities to enhance functional performance in everyday life; and work evaluation, work hardening, and workplace adaptations.

Today's occupational therapists work in clinical and community practice, administration, education, and research. Work settings include rehabilitation centers and hospitals; public and private schools; home health agencies; mental health centers and psychiatric hospitals; private practice; vocational rehabilitation centers and industrial clinics; private industry, wellness and prevention programs; and hospices.

The curriculum is designed to link theoretical and technical knowledge in occupational therapy with professional values, attitudes, and skills. The education of each student is based on the philosophy that "occupational performance" (including self-care, work, and leisure/play) is central and provides a purpose and meaning to one's life. Professional standards of practice, ethics, and continued professional growth are emphasized throughout the program. Program requirements include seven quarters of professional course work and six months of full-time fieldwork training. Fieldwork training must be completed within 24 months after completion of professional course work. Completion of all program requirements leads to a Master of Occupational Therapy degree awarded by the School of Medicine, Department of Rehabilitation Medicine.

The Occupational Therapy program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), 4720 Montgomery Lane, P.O. Box 31220, Bethesda, MD 20824-1220, phone 301-652-2682. Graduates of the program are eligible to sit for the national certification examination for the occupational therapist. The National Board for Certification in Occupational Therapy (NBCOT) is the certifying agency responsible for the development and implementation of this exam. Most states, including Washington, require state licensure in order to practice.

Master of Occupational Therapy

Admission Requirements

Applicants must have completed a bachelor's degree in any major and taken the Graduate Record Exam (GRE) within the past five years. In addition, there are eight prerequisite courses that must be completed prior to being admitted to the program. The admission process occurs once a year for entry to the program in autumn quarter of each year; applications are evaluated starting January 15 of each year.

Specific prerequisite courses at the UW include the following. For students who have attended schools outside of the UW, comparable courses must be taken:

- * *Natural Sciences:* Survey of Physiology (ZOO 118), 5 credits; General Anatomy (B STR 301), 4 credits; Introduction to General Chemistry, (CHEM 120), 5 credits; General Physics (PHYS 114), 4 credits; General Physics Laboratory (PHYS 117), 1 credit; Basic Educational Statistics (EDPSY 490), 3 credits.
- * *Social Sciences:* Abnormal Psychology (PSYCH 305), 5 credits; Developmental Psychology (PSYCH 306), 5 credits; Survey of Sociology (SOC 110), 5 credits or Principles of Sociocultural Anthropology (ANTH 202), 5 credits.

To apply, students must have completed five of the prerequisite courses, with three courses in the natural sciences. They must have earned a minimum GPA of 3.0 in the prerequisite courses with no single course graded less than 2.0; and have a GPA of 3.0 on the most recent 60 semester or 90 quarter credits. Admission is based on academic ability, communication skills, and understanding and experience in occupational therapy. Detailed program requirements and selection process information may be obtained by calling 206-598-5392, from the program's Web page, or by sending an email to ot@u.washington.edu.

Degree Requirements

The following courses must be completed satisfactorily in the schedule sequence, beginning autumn quarter only, at the UW: REHAB 400, REHAB 401, REHAB 403, REHAB 414, REHAB 442, REHAB 444, REHAB 445, REHAB 448, REHAB 451, REHAB 452, REHAB 570, REHAB 571, REHAB 572, REHAB 574, REHAB 575, REHAB 576, REHAB 577, REHAB 578, REHAB 579, REHAB 580, REHAB 581, REHAB 582, REHAB 584, REHAB 585, REHAB 587, REHAB 591, REHAB 594, CONJ 480, and HUBIO 563.

Student Evaluation: The University grade-point system is used in student evaluation. A student must maintain a cumulative GPA of 3.0 in all required professional course work to maintain satisfactory standing and to graduate. Detailed scholastic requirements are available on the program's Web page.

If at any point the OT curriculum cumulative GPA falls below 3.0, the student is placed on academic probation and the student must raise it to 3.0 by the end of two subsequent quarters. If a student is unable to remove his/her probation status, he/she is subject to dismissal from the program.

The student must satisfactorily complete all academic course work before taking the two required Level II Fieldwork placements (REHAB 594). Both of the two required Level II Fieldwork placements must be satisfactorily completed within two years after the completion of the academic portion of the program in order to graduate from the program.

For more information on the Master of Occupational Therapy program, visit the department's Web site.

Physical Therapy

Head

Mark Guthrie

Physical therapy is a direct form of professional patient care that can be applied in most disciplines of medicine. The principal objective in physical therapy is to restore or improve motor function in individuals with musculoskeletal or neuromuscular problems.

Management of problems related to motor function is only part of the work of physical therapy. Equally important is a rebuilding of self-confidence and the creation of a desire to return to a normal, active life. Other primary objectives of physical therapy are prevention of disability and pain, and training in mobility skills for those who must adapt to permanent disability.

As a consequence of the scope of the profession, physical therapists function in a variety of settings, the most familiar being the hospital. Physical therapists also plan, provide, evaluate, and direct patient care in outpatient clinics, rehabilitation centers, health maintenance organizations, developmental centers, home-health agencies, schools, extended-care facilities, voluntary health programs, industry, and private practices. The physical therapist may be found anywhere quality health care is needed. Increasingly, physical therapists are becoming involved in basic and clinical research, such as the academic community, either as full-time faculty members or as supervisors of clinical education, and as consultants in local, state, and federal health-planning activities.

Physical therapists function in compliance with the licensing laws and ethical principles that govern the practice of physical therapy. The steps to licensure as a physical therapist vary slightly from state to state, but all

physical therapists graduate from an accredited curriculum of physical therapy that includes a specific period of clinical training. As physical therapy relates to the majority of medical specialties, the education program is broad in scope, including an emphasis on physical and social sciences. The physical therapist evaluates the patient's problem by testing such factors as range of joint motion, muscle strength, posture and gait, pulmonary function, sensation and sensory perception, orthotic and prosthetic fit, reflexes and muscle tone, and functional skills. Some of the procedures used may include ultrasound, superficial heat and cold, electrical stimulation, massage, traction, joint mobilization, biofeedback, therapeutic exercise, and training in the use of orthotic, prosthetic, and other assistive devices, such as crutches, canes, and wheelchairs.

As with all professionals in health fields, physical therapists are responsible for subscribing to a program of continuing education. Some therapists also develop the knowledge and skills of a specialist via continuing education and concentrated practice in one area, such as sports or pediatric therapy. A formalized mechanism for certifying specialists is implemented by the national professional association, the American Physical Therapy Association.

The University of Washington program in physical therapy is accredited by the American Physical Therapy Association Commission on Accreditation in Physical Therapy Education.

Doctor of Physical Therapy

Admission Requirements

Enrollment is limited to 30 students each year and admission is competitive.

Application is restricted to those who are U.S. citizens or U.S. permanent residents by the autumn program entrance date.

Applicants are required to submit scores from the General Test portion of the Graduate Record Examinations (GRE).

Prior to the application deadline of December 15, the student must have met the following minimum academic requirements:

- * Minimum 3.00 GPA on all college-level courses
- * Minimum 3.00 GPA on PT prerequisite courses
- * Minimum 2.0 (C) grade on each PT prerequisite course
- * 22 quarter credits (or 50%) of PT prerequisite courses completed. For PT prerequisite courses, see Web site at http://depts.washington.edu/rehab/pT/dpt_apply.html

Minimum requirements above must be maintained until program entrance and all prerequisite courses must be finished at that time. Applicants must complete a bachelor's degree before they start the program.

Most clinical internship placement sites require potential trainees to undergo a Washington State Patrol criminal history background check for crimes against vulnerable populations. To ensure that all students offered positions in the PT program have no such history and therefore will be able to finish the clinical portion of the curriculum, the completion of a criminal background check release form is required of applicants offered admission.

Degree Requirements

149 credits, as follows:

Year One

- * *Autumn Quarter:* MEDEX 452 (6), REHAB 403 (2), REHAB 444 (4), REHAB 451 (1), REHAB 504 (3), REHAB 517 (2)
- * *Winter Quarter:* CONJ 480 (5), REHAB 400 (4), REHAB 445 (4), REHAB 452 (1), REHAB 506 (2), REHAB 517 (2)
- * *Spring Quarter:* REHAB 401 (4), REHAB 442 (4), REHAB 448 (1), REHAB 507 (3), REHAB 517 (2), REHAB 536 (2), REHAB 566 (1)
- * *Summer Quarter:* REHAB 500 (2), REHAB 508 (4), REHAB 517 (2), REHAB 537 (3), REHAB 538 (2)

Year Two

- * *Autumn Quarter:* REHAB 414 (2), REHAB 501 (4), REHAB 511 (5), REHAB 566 (1)
- * *Winter Quarter:* REHAB 502 (3), REHAB 512 (5), REHAB 523 (3), REHAB 529 (2)
- * *Spring Quarter:* REHAB 502 (2), REHAB 503 (3), REHAB 513 (3), REHAB 527 (3), REHAB 566 (1)
- * *Summer Quarter:* REHAB 416 (2), REHAB 476 (2), REHAB 505 (2), REHAB 514 (3), REHAB 591 (1)

Year Three

- * *Autumn Quarter:* REHAB 591 (2), REHAB 595 (10)
- * *Winter Quarter:* REHAB 591 (2), REHAB 595 (10)
- * *Spring Quarter:* REHAB 591 (2), REHAB 595 (10)

Prosthetics and Orthotics

Head

John Ferguson

The prosthetist-orthotist is a member of the rehabilitation health care team, which also includes physicians, surgeons, physical and occupational therapists, psychologists, vocational rehabilitation counselors, and other appropriate specialists. Team members work together with physically challenged individuals to enhance their daily life and increase their functional abilities.

The two groups of prosthetic-orthotic devices which can potentially enter into the rehabilitation of an individual are (1) prosthetic devices, which replace or substitute for a missing limb or part of a limb, and (2) orthotic devices, which help with the control of motion and the support of a weakened body segment.

Practitioners provide direct patient care and management. Practitioners work in conjunction with physicians, surgeons, and therapists to evaluate the prosthetic or orthotic needs of the patient. They design the appropriate device, supervise technicians who fabricate them, and evaluate the fit and functional use for each patient. To evaluate function, the prosthetist-orthotist must have a detailed knowledge of anatomy and kinesiology, joint range of motion, muscle strength and human locomotion.

Before designing a prosthesis or orthosis, the prosthetist-orthotist examines a patient to find any conditions that will affect the future success of the orthosis or prosthesis. Following the evaluation, the prosthetist-orthotist will obtain an impression of the affected segment along with the appropriate measurements. A technician fabricates the prosthesis or orthosis, and the prosthetist-orthotist fits the patient and makes changes as necessary.

Adviser

BB919 Health Sciences Center
206-616-8586

The prosthetics and orthotics division offers the following programs of study:

- * The Bachelor of Science degree with a major in prosthetics and orthotics

Bachelor of Science

Suggested First- and Second-Year Courses: Courses fulfilling the general education requirements including proficiency and areas of knowledge (20 VLPA, 20 I & S) should be completed during the first two years prior to entry into the program. Prerequisite coursework (general biology, general physics, human anatomy and physiology, general chemistry, psychology) is also completed during this time. Suggested courses include: statistics (STAT 220), interpersonal communication (COM 103), introduction to public speaking (COM 220), personality and individual differences (PSYCH 205), and developmental psychology (PSYCH 306).

Department Admission Requirements

1. Minimum 2.70 cumulative GPA
2. Prior to admission to the program, students must complete the following prerequisites with a minimum combined GPA of 2.70: general biology (BIOL 161, BIOL 162) or microbiology (MICROM 301, MICROM 302), general physics (PHYS 114, PHYS 117, PHYS 115, PHYS 118), general psychology (PSYCH 101), general chemistry (CHEM 120), human anatomy (B STR 301), physiology (BIOL 118).
3. Completion of the University writing and reasoning requirements (5 credits of English composition and 5 credits of quantitative and symbolic reasoning with a minimum grade of 2.0; two additional writing courses totaling a minimum of 10 credits with a minimum grade of 0.7; and the College of Arts and Sciences Areas of Knowledge requirements (20 credits in Visual, Literary & Performing Arts, 20 credits in Individuals and Societies, and 20 credits in the Natural World). Courses listed above may apply to Areas of Knowledge requirements.

Postbaccalaureate (fifth-year) students are exempt from the writing and reasoning requirements but not from the Areas of Knowledge requirements.

4. Admission to the program is competitive based on scholastic achievement, written skills, references and involvement in activities or work related to the health professions.
5. Departmental Application Deadline: February 15 for entry Autumn quarter.

Major Requirements

90 credits as follows:

1. *Courses:* The following courses must be taken in the scheduled sequence beginning autumn quarter only at the University of Washington: REHAB 340, REHAB 341, REHAB 342, REHAB 343, REHAB 400, REHAB 401, REHAB 402, REHAB 403, REHAB 414, REHAB 420, REHAB 421, REHAB 423, REHAB 424, REHAB 427, REHAB 428, REHAB 430, REHAB 442, REHAB 444, REHAB 445, REHAB 451, REHAB 452, REHAB 448, REHAB 499; CONJ 480.
2. *Grade Requirements:* A student must maintain a minimum cumulative program GPA of 2.50, and "credit" grades in all courses that are graded credit/no credit, to maintain good standing in the program and be eligible for graduation. A minimum grade of 2.0 is required in each course. A grade below 2.0 in a required course must be repeated at the next offering with a minimum grade of 2.0 received in the repeated course.
3. *Continuation Policy:* If at any point the cumulative grade point in the curriculum courses falls below 2.50, the student is placed on academic probation. In order to be taken off probation, the student must achieve a curriculum grade point average of 2.50 by the end of two consecutive quarters, or within a time frame designated by the Advisory and Evaluation Committee. If a student is unable to remove his/her probation status, he/she is subject to dismissal from the program.

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The prosthetics-orthotics degree is recognized as a broad, undifferentiated degree requiring the acquisition of general knowledge and basic skills in applicable domains of medicine. The educational process of a prosthetist-orthotist includes the assimilation of knowledge, acquisition of technical skills, and development of judgment through patient care experiences in preparation for independent analysis and problem solving required in clinical practice. Prosthetists and orthotists are employed in private practices and hospitals. There are also a limited number of opportunities in research positions throughout the country.

Upon successful completion of the prosthetics and orthotics program, the student will have learned the skills necessary to function as an entry-level resident in prosthetics-orthotics, and is awarded a Bachelor of Science degree by the University of Washington School of Medicine. The practitioner program is accredited through the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

The degree in prosthetics-orthotics gives the student eligibility to enter a one-year clinical residency for each discipline at a National Commission on Orthotics and Prosthetics Education (NCOPE) approved site. This residency requirement must be completed for eligibility to apply for the National Certification Boards administered by the American Board for Certification in Orthotics and Prosthetics, Inc.

- * *Instructional and Research Facilities:* Much of the didactic and patient clinical instruction occurs in the ninth-floor classroom areas in the "BB" wing of the Health Sciences Building. A student fabrication laboratory on the eighth floor of the Health Sciences Building accommodates the technical laboratory components of the curriculum.

Students are placed throughout the curriculum in eighteen facilities in the surrounding Seattle area for their required 500 hours of clinical experience.

- * *Honors Options Available:* None
- * *Research, Internships, and Service Learning:* None available
- * *Department Scholarships:* None offered
- * *Student Organizations/Associations:* None

Post-Professional Programs

The Master of Science in Rehabilitation Medicine has three primary pathways: occupational therapy, physical therapy, and rehabilitation medicine. This program is designed for rehabilitation practitioners who want to pursue a program of coursework and research to enhance their professional growth. Additional information may be found at the program's Web site (depts.washington.edu/rehab/education).

Master of Science, Rehabilitation Medicine (Occupational Therapy Pathway)

This degree program is designed to prepare occupational therapists to discuss rehabilitation science, models of disability, and/or theory and frames of reference relating to occupational therapy; to design and conduct research; to provide instruction, and to administer occupational therapy services or provide a higher level of clinical service. Independent-study options and electives offer flexibility, allowing the student to meet individual objectives. Completion of a data-based thesis is required. Full-time students generally complete the course work in four quarters. The additional time to complete the thesis requirement varies.

Admission Requirements

- * Baccalaureate degree from an accredited institution of higher learning. Minimum overall 3.00 GPA or minimum 3.25 GPA for the most recent 60-semester or 90-quarter credits.
- * Professional Certification. National Certification, Occupational Therapist Registered.
- * Graduate Record Exam (GRE) scores
- * English Language Competence. For applicants whose native language is not English, a minimum TOEFL score of either 580 (written exam) or 237 (computer-based exam) is required.
- * Professional Experience. One year of occupational therapy practice preferred.

Degree Requirements

36 credits, as follows:

- * Core courses: REHAB 520 (1-5, max. 5), REHAB 581 (3); either EDPSY 490 (3) or BOST 511 (4); either EDPSY 591 (3) or EDSPE 511 (3); MEDED 520 (2)
- * Thesis: 9 credits of REHAB 700
- * Elective Courses: Selected from the following list or from departments throughout the University such as Business Administration, Special Education, Health Services, Nursing, Psychology, Physiology, or Social Work: EDPSY 590 (3), MHE 523 (3), HSERV 511 (3/4), REHAB 522 (2), REHAB 546 (1-3, max. 3), REHAB 567 (1-12, max. 24), REHAB 600 (*)

Course Descriptions

See page 577.

Surgery

BB487 University of Washington Medical Center

The Department of Surgery carries out instruction during all four years of School of Medicine attendance. The third-year six-week clerkship constitutes the core of student exposure to general surgery and is required of all students. The fourth-year emergency-room clerkship is also a required part of the curriculum. The department offers a variety of fourth-year elective clerkships in a number of the specialty aspects of the department's clinical activities, including but not limited to trauma, cardiothoracic surgery, plastic surgery, vascular surgery, transplantation, surgical critical care, pediatric surgery, and the management of burn patients.

Course Descriptions

See page 580.

Urology

BB1115 Health Sciences

Urology is the surgical discipline concerned with diseases of the urinary tract in males and females, and the genital system in the male. The science is broadly based: major areas of practical and investigative concern include congenital defects, cancer, renal diseases, reproductive biology, neuropathology, renal stone formation, and transplantation.

Clinically, the field encompasses a large variety of technical skills including real-time imaging and manipulation, endoscopy, laparoscopy and robotics,

and open surgery. Medical diagnosis and treatment are a large part of the discipline.

The department is actively involved in patient care, instruction, and research concerning the problems of urology. Training for medical students starts in the second year and continues through the third and fourth years. Training is also provided for residents, fellows, nurses and applied specialists. The department is responsible for a fully approved urology residency program. Contact the Urology Clerkship Coordinator at 206-731-3205 for further information.

Course Descriptions

See page 581.

School of Nursing

T310 Health Sciences

Dean

Nancy F. Woods
T318 Health Sciences

Associate Deans

Ruth F. Craven, Educational Outreach
Pamela H. Mitchell, Research
Susan L. Woods, Academic Services

Nurse professionals are members of interdisciplinary teams in clinics, hospitals, and community settings, and work with people of all ages, cultural backgrounds, and lifestyles to help them achieve the highest level of wellness possible. Nurse practitioners fill critical health care needs in both urban and rural settings, often for portions of the population who have not received adequate health care. Nurse scientists conduct important research about a variety of health problems and how best to promote health, prevent disease, and care for people who are ill. Nurses also teach in colleges and universities throughout the world.

Undergraduate Program

Adviser

T310 Health Sciences, Box 357260
206-543-8736
sonas@u.washington.edu

The School of Nursing offers the following programs of study:

- * Bachelor of Science in Nursing degree with eligibility to take the licensure examination to become a registered nurse.
- * A four-quarter modification of the basic curriculum is available for the registered nurse who is able to validate selected nursing courses through written examination and who intends to complete a master's degree program. This B.S.N. completion program is available at UW Bothell and UW Tacoma.

Bachelor of Science in Nursing

Suggested First- and Second-Year College Courses: See below, under Admission Requirements.

Admission Requirements

Admission to the nursing major occurs once a year, for autumn quarter, with an application deadline of January 15. Selection is competitive.

Application

1. To be considered for admission, applicants must satisfy one of the following requirements at time of application.
 - a. Three out of six prerequisite science courses completed with a minimum GPA in these three courses of 3.00
 - b. Four out of six prerequisite science courses with a minimum GPA in these four courses of 2.80. These six prerequisite courses are CHEM 120, CHEM 220, BIOL 118/BIOL 119, B STR 301, MICROM 301, and NUTR 300.
2. Together with the application and college transcript(s), applicants submit a personal statement; a resume outlining volunteer/paid health-care experience, community service, and cultural awareness; and a recommendation from a health care provider (employer or volunteer coordinator).
3. Applicants are expected to have 100 hours of health care experience in a paid or volunteer position in one setting for three months or more. The majority of applicants present health care experiences of several hundred hours for nine months or more.
4. After an initial review of all applications, some applicants are asked to attend a proctored essay session. The proctored essay dates are published in the admissions publication. Eligible applicants are invited via email.

Entrance Requirements: Prior to beginning the nursing program in the autumn, students must meet the following requirements:

1. A minimum of 90 credits to include the following courses:
 - a. Written communication (10 credits): English composition and W-courses.
 - b. Problem-solving (8 credits): one QSR course, chosen from MATH 107, MATH 111, MATH 112, MATH 120, MATH 124, MATH 134, MATH 144, PHIL 115, PHIL 120, PHIL 470, or Q SCI 291. One statistics course, such as STAT 220, STAT 311, Q SCI 381, QMETH 201, or EDPSY 490.
 - c. Visual, Literary, & Performing Arts (VLPA) (15 credits).
 - d. Individuals & Societies (I&S) (15 credits): to include NURS 201 or equivalent.
 - e. Natural World (NW) (26 credits): to include CHEM 120, CHEM 220, BIOL 118, BIOL 119, B STR 301, MICROM 301, NUTR 300.
 - f. Electives to complete 90 credits.
2. A minimum 2.00 cumulative GPA is required, and a minimum grade of 2.0 for each prerequisite course. Because admission is competitive, the GPA for admission is usually significantly higher.

For additional information on admission criteria, specific prerequisites, and deadlines, as well as application forms, contact the Office of Academic Services, School of Nursing, (206) 543-8736 or 1-800-759-NURS. Monthly information sessions are offered in the School of Nursing, Health Sciences Building T310, on the first Tuesday of each month from noon to 1 p.m. as well as evening sessions from 5:30 to 6:30p.m. on the first Tuesday of January, May, September, and November.

Major Requirements

Students need a minimum of 180 credits to graduate with a bachelor's degree from the University of Washington. The required credits in the nursing curriculum total 89; thus 91 credits must be earned through general education, nursing prerequisite, and elective courses.

Year One of Program

- * *Quarter 1 -- Autumn:* NCLIN 302 (3), NCLIN 306 (4), NURS 304 (3), NURS 301 (3), NURS 309 (2)
- * *Quarter 2 -- Winter:* NURS 401 (4), NCLIN 402 (4), NURS 308 (3), NURS 310 (2), NURS 313 (1)
- * *Quarter 3 -- Spring:* NURS 405 (5), NCLIN 406 (4), NURS 303 (3), NURS 407 (3)

Year Two of Program

- * *Quarter 4/5* -- Autumn:* NURS 415 (5), NCLIN 416 (4), NMETH 403 (3), NURS 410 (3),
- * *Quarter 4/5* -- Winter:* NURS 417 (5), NCLIN 418 (4), NCLIN 409 (6)

*Half of senior class completes courses listed above in Quarter 4, followed by those in Quarter 5; the other half of the class completes courses listed under Quarter 5, followed by those listed in Quarter 4.

- * *Quarter 6 -- Spring:* NCLIN 411 (12), NURS 412 (3)

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The School of Nursing prepares its graduates to function as generalists in professional nursing practice and to collaborate with other health-care providers. The six-quarter undergraduate curriculum emphasizes theory and clinical practice to ensure critical thinking, human caring, and clinical expertise. Clinical experiences are provided in institutional and community settings for preventive and acute care. The ten goals of the BSN program are online at http://www.son.washington.edu/eo/bsn_description_goals.asp.
- * *Instructional and Research Facilities:* Learning Laboratory
- * *Honors Options Available:* With College Honors; With Distinction (Program Honors). See adviser for requirements.
- * *Research Internships and Service Learning:* Students complete eight clinical courses during the B.S.N. program beginning with the first quarter of the program. Each student experiences placements in medical-surgical nursing, pediatric, family nursing, psychosocial mental health, and community-based nursing. Clinical hours per course range from six hours/week during the first quarter to 24 hours/week during the final quarter.

- * *Department Scholarships:* Limited scholarships based on student need established by FAFSA. Students are invited to apply after they have been admitted to the program by completing the School of Nursing Financial Aid application.
- * *Student Organizations/Associations:* Students may join the Professional Organization of Nursing Students (PONS) after admission to the program. PONS' involvement spans all aspects of the undergraduate program: recruitment, orientation, education, fund raising, and social events.

Graduate Program

Graduate Program Coordinator
T310 Health Sciences, Box 357260
206-543-8736
sonas@u.washington.edu

The School of Nursing offers graduate study leading to the degrees of Master of Nursing, Master of Science, and Doctor of Philosophy in nursing science. At the master's level, programs are designed to meet the many needs of a diverse student body by providing opportunities for advanced study, practice, and research in nursing.

The Masters Entry Program in Nursing (M.E.P.N.) is a Master of Nursing (M.N.) option for students without previous nursing preparation who have a baccalaureate degree in a non-nursing field, and who wish to earn a Master of Nursing degree. It is a two part program. The first five quarters of M.E.P.N. are full time, provide a generalist foundation in nursing, and qualify the student to take the state RN licensure (NCLEX) examination. Once students have completed the first five quarters of M.E.P.N., they begin regular graduate course work in one of 18 M.N. focal areas (see below).

The Master of Nursing program develops increased competence in selected areas of advanced practice nursing. The following focus areas are available: adult acute-care nurse practitioner (cardiovascular/AIDS/oncology), adult/older adult nurse practitioner, advanced practice community-health systems nursing (cross-cultural nursing/occupational health nursing/healthy aging/communities for youth, rural health), advanced practice in care systems management, advanced practice forensic nurse specialist, adult nurse practitioner and home care, advanced practice genetics nursing, advanced practice options in bio-behavioral nursing, family-centered pediatric nursing, infectious disease nurse practitioner, nurse midwifery, perinatal nursing/neonatal nurse practitioner, psychiatric-mental health nurse practitioner, family nurse practitioner, pediatric nurse practitioner, adult and women's health nurse practitioner, rural adult nurse practitioner, and an independent M.N. Research is an integral part of all programs. A thesis is required in the Master of Science program. The Master of Nursing program provides the option of a thesis or non-thesis project.

Part-time study is available in most focus areas of the M.N. program. Course work may be started prior to formal admission to a program as a graduate nonmatriculated student (GNM). GNM status allows the student to earn up to 12 graduate-level credits which may be applied to a graduate program if the student is later admitted. Time limits for acceptance of courses taken as a GNM student are six years for a master's degree and ten years for a doctoral degree from the first course to completion of the degree.

The Doctor of Philosophy in Nursing Science program prepares scientists capable of advancing nursing practice and education through research and scholarly activity. The program provides for rigorous research training designed for individuals interested in careers in academia or for other types of leadership positions in health-service agencies in which the ability to design, plan, and implement research in nursing is a significant expectation.

Master Entry Program in Nursing

Admission Requirements

M.E.P.N. applicants apply to a specific Master of Nursing focal area at time of application, and have the option of specifying a first and second choice of Master of Nursing focal area.

- * Baccalaureate degree from a regionally accredited institution of higher learning with a minimum GPA of 3.00 on a 4.00 scale for the last 90 graded quarter credits by date of enrollment.
- * Minimum 3.00 GPA for all college level work.

- * Completion of required prerequisite courses, including:
 - o Chemistry (three-quarter CHEM 120, CHEM 220, CHEM 221 for all UW students; two-quarter sequence – one general chemistry and one organic - for non-UW applicants), anatomy, physiology, nutrition, and microbiology, with a minimum grade of 3.0 in each. Three of the six or seven courses must be completed at the time of the application. A fourth course must be completed by the end of autumn quarter (i.e., students applying for summer 2007 admission must complete the fourth course by the end of fall quarter 2006), and all six or seven courses before enrollment, with at least a 3.0 grade in each.
 - o A 5-credit course in life span growth and development with a grade of at least 3.0, to be completed before enrollment.
 - o A 3-credit basic course in descriptive and inferential statistics with a grade of at least 3.0.
- * GRE (General Exam) scores
- * International applicants, as well as immigrants to the United States and U.S. permanent residents, whose native language is not English, and who have not received a bachelor's degree or higher in the U.S., Australia, Canada, Ireland, New Zealand, or the United Kingdom, must submit both TOEFL and TSE scores.
- * Resume and background summary.
- * Three letters of reference consisting of one health care reference, one academic reference, and one character reference (cannot be completed by a family member). School of Nursing forms for each of these reference letters must be used and are provided with the online application form.
- * Goal statement relevant to the M.E.P.N. program and to the Master of Nursing focal area selected. Students who choose a first and second choice of master's focal areas must submit a separate goal statement for each one. M.E.P.N. applicants may apply to any of the Master of Nursing focal areas, with the exception of adult and women's health care nurse practitioner and neonatal nurse practitioner.
- * Criminal history/background check clearances: From Washington State and, for students who have lived outside Washington during the past three years, a background check from each state in which they resided.
- * One official transcript from each collegiate institution attended.
- * School of Nursing interview(s). Applicants considered competitive for M.E.P.N. after an initial review are invited for group interviews to determine if the applicant (1) is a potential match for the profession of nursing; (2) is a match for the Master of Nursing focal area(s) applied to; (3) demonstrates breadth of understanding; (4) is an effective and sensitive communicator; and (5) demonstrates emotional maturity, insight, sound judgment, and critical thinking skills. Group interview invitations are sent out no later than December 15; interviews are scheduled the first week in January. Several focal areas require individual interviews in addition to the M.E.P.N. committee group interviews; selected applicants to those areas are contacted directly to arrange the additional interview.

Degree Requirements

117-120 credits, as follows:

- * *Pre-licensure coursework:* NCLIN 302 (1-5, max. 5), NCLIN 306 (4), NCLIN 402 (4), NCLIN 406 (1-10, max. 10), NCLIN 409 (6), NCLIN 411 (12-20, max 20), NCLIN 416 (4), NCLIN 418 (4), NURS 303 (2/3), NURS 304 (3), NURS 308 (3), NURS 309 (2), NURS 310 (2/3), NURS 401 (5), NURS 405 (5), either NURS 407 (3) or NURS 579 (3), NURS 412 (3), NURS 415 (5), NURS 417 (3), NURS 522 (3)
- * *M.N. Portion:* Students who have made satisfactory progress in the first five quarters of M.E.P.N., i.e., earning a minimum 2.0 in all graded classes and "Credit" in non-graded classes; earning a minimum 3.00 cumulative GPA; meeting essential qualifications; and who have taken the NCLEX, may begin regular graduate coursework in one of 18 M.N. focal areas. Time required to complete the M.N. portion of M.E.P.N. varies between four and seven quarters of full time study. Focal areas within the M.N. program must comply with the following minimum requirements: nursing science and professional foundations (15 credits); clinical practice (6 credits); scholarly inquiry (11 credits with scholarly project or 14 credits with thesis); related coursework (6 credits). Many focal area requirements exceed this minimum. Part-time study is available for some programs.

Master of Nursing

Admission Requirements

- * Baccalaureate degree from a nationally accredited nursing program with a minimum GPA of 3.00 on a 4.00 scale for the last 90 graded quarter credits, or

- * Associate of arts degree or diploma from a nationally accredited RN program, in combination with a baccalaureate degree in a field other than nursing, acceptable to the UW. In addition, RN's with non-nursing baccalaureate degrees are required to demonstrate competencies in community health and professional leadership equivalent to those of baccalaureate degree nursing graduates, and are required to submit nursing equivalency essays.
- * A 3-credit basic course in descriptive and inferential statistics with a grade of at least 2.0.
- * Official Graduate Record Examination (GRE) General Test Scores.
- * International applicants, as well as immigrants to the U. S. and U. S. permanent residents, whose native language is not English, and who have not received a bachelor's degree or higher in the U.S., Australia, Canada, Ireland, New Zealand or the United Kingdom, must submit TOEFL and TSE scores. A minimum official TOEFL score of 580 (or a TOEFLC score of 237) and a minimum TSE score of 55 are required. Test scores must be less than two years old from the test date. No waivers are allowed.
- * Resume and background summary.
- * Three letters of recommendation, one academic, one clinical, and one other.
- * Admission essay relevant to the program objectives. (If applying to another focal area as a second choice, a second goal statement must be submitted.)
- * Criminal history/background check clearances: Forms required to perform a background check in Washington State, and a check against the federal register of persons excluded from participation in federally funded health programs, are included in the application packet and must be completed and submitted with the application. In addition, students who have resided outside Washington State over the past three years are asked to submit an official criminal history background check from each state in which they have resided.
- * Resume describing relevant work, professional, and volunteer experiences.
- * Applications to both the School of Nursing and to the UW Graduate Admissions Office. The School of Nursing application must be accompanied by one official transcript from each collegiate institution attended.
- * All applicants to the Master of Nursing program must have an active, unrestricted U.S. RN license at the time of application. If the applicant does not have such a Washington State license, he/she must obtain one prior to beginning the UW Master of Nursing program, should the applicant be admitted.

Degree Requirements

38-41 credits, as follows:

Nursing science and professional foundations (15 credits); clinical practice (6 credits); scholarly inquiry (11 credits with scholarly project or 14 credits with thesis); related coursework (6 credits). Specific courses determined in consultation with adviser according to the student's specific background and needs.

Master of Science

Admission Requirements

- * A baccalaureate degree in any discipline from a regionally accredited institution of higher learning with a minimum GPA of 3.00 on a 4.00 scale for the last 90 graded quarter credits by date of enrollment. Applicants to the Master of Science need not have a previous degree in nursing.
- * A 3-credit basic course in descriptive and inferential statistics with a grade of at least 2.0. Click here for a list of Approved Statistics Courses.
- * Official Graduate Record Examination (GRE) General Test Scores.
- * International applicants, as well as immigrants to the U.S. and U.S. permanent residents, whose native language is not English, and who have not received a bachelor's degree or higher in the U.S., Australia, Canada, Ireland, New Zealand or the United Kingdom, must submit official TOEFL scores. Test of Spoken English (TSE) scores for international Master of Science applicants are not required. More information for international applicants is found under International Applicants.
- * Three letters of recommendation, two from persons qualified to comment on the applicant's academic abilities and one from a person who can provide work-related (practice) information.
- * Admission essay relevant to the program objectives. (If applying to another focal area as a second choice, a second goal statement must be submitted. The application is reviewed for the second choice after a decision has been made on the application to the first choice and after the application deadline.)

- * Criminal history/background check clearances: Forms required for a background check in Washington State, and a check against the federal register of persons excluded from participation in federally funded health programs, are included in the application packet. Students who have resided outside Washington State over the past three years submit an official criminal history background check from each state in which they have resided.
- * Resume describing relevant work, professional, and volunteer experiences.

For students planning to take clinical nursing courses as part of their program of study, an active, unrestricted Washington RN license. Other applicants to the Master of Science program are not required to have an active RN license or to have a previous degree in nursing.

Degree Requirements

49 credits, as follows:

Nursing science (15 credits); professional foundations (3 credits); theory development (5 credits); modes of inquiry (11 credits); thesis (9 credits); related coursework (6 credits). Specific courses determined in consultation with adviser according to the student's specific background and needs.

Master of Nursing/Master of Public Health Concurrent Degree Program

Admission Requirements

See admission requirements for M.N. and M.P.H. individual degrees. Students must apply separately to, and be accepted by, each school. Students already enrolled in one school may apply for admission to the other and to the concurrent degree track. Students are encouraged to complete up to one year of studies in one school before entering the other.

Degree Requirements

See M.N. and M.P.H. individual degree requirements; differences are as follows:

At least 18 quarter credits for the master's degree in each program must be numbered 500 and above. Numerical grades must be received in at least 18 quarter credits of coursework for each degree and all required courses must be taken graded. Up to 12 credits taken in one school can be counted toward the other school's total credit requirements, if approved by both programs. Electives for each department can be fulfilled by taking the required courses of the other department.

One thesis is required. The nine required thesis credits can be taken in either school, which then becomes the home school and the source of the thesis committee chair as well as the program authorized to approve the thesis. Each school agrees to accept the other school's thesis as meeting its thesis requirement. Faculty from each school should be involved in development of the thesis and sit on the thesis committee.

Doctor of Philosophy

Admission Requirements

- * A baccalaureate degree from a college or university of recognized rank. Though a master's degree in nursing is the background of the majority of applicants, neither a nursing background nor RN licensure is required.
- * Official Graduate Record Examination (GRE) General Test Scores.
- * International applicants, as well as immigrants to the U.S. and U. S. permanent residents whose native language is not English, and who have not received a bachelor's degree or higher in the U.S., Australia, Canada, Ireland, New Zealand, or the United Kingdom, must submit official TOEFL scores. More information for international applicants is found under International Applicants.
- * An example of applicant's scholarly writing (25 pages or less). Examples are a published or unpublished manuscript illustrative of concept analysis, an in-depth literature review in a focused area, or a research report. Theses are not accepted. The paper is reviewed for clarity and thoroughness, its articulation with relevant published literature, and the degree to which it raises important issues for the development of nursing science. (International students whose original scholarly writing is not in English should submit a copy of the writing translated into English);
- * Letters of recommendation from three persons knowledgeable about the individual's potential for a research career in nursing;

- * Personal statement in response to specific questions listed on the application related to the pursuit of doctoral studies. The statement is used to evaluate the applicant's ability in written self-expression and the congruency of goals and research interests with the program objectives.

Criminal history/background check clearances: Forms required for a background check in Washington State, and a check against the federal register of persons excluded from participation in federally funded health programs, are included in the application packet and must be completed. In addition, applicants who have resided outside Washington State over the past three years are asked to submit an official criminal history background check from each state in which they resided.

Degree Requirements

93 credits minimum, as follows:

Theory and Domain of Knowledge (minimum 43 credits): Courses include: NURS 588 (3); NURS 589 (3); NURS 590 (5); NURS 592 (4); NURS 591 (3); NURS 595 (3); NURS 587 (2, 2); graduate nursing courses (6 credits); related fields (12 credits).

Scholarly Inquiry (minimum 50 credits): Courses deal with the means of developing knowledge. There is exposure to a variety of approaches with encouragement to develop advanced skills in at least one methodology. Courses in this category are grouped into four required sub-categories:

- * Methodological Perspectives in Nursing Science: NMETH 580 (5 credits)
- * Design/Methods/Analysis Sequence: 18 credits
- * Advanced Methods: 8 credits minimum, from the following: NMETH 581 (2-6); NMETH 582, NMETH 583 (4, 4); NMETH 591 (4); NMETH 592 (2-4); NMETH 593 (4); NMETH 584 (4); NMETH 586 (4); NMETH 587 (4)
- * Statistics: 10 credits minimum, from the following: BIOST 511, BIOST 512, BIOST 513 (4, 4, 4); EDPSY 593 (5), EDPSY 594 (5), PSYCH 513 (4), PSYCH 514 (4), PSYCH 515 (4); SOC 424, SOC 425 (3, 3); NMETH 590 (2). Optional advanced statistics courses include BIOST 524 (3), BIOST 574 (3), SOC 526 (3), SOC 529 (3)
- * Dissertation: 27 credits of NMETH 800
- * Optional Elective Colloquium: NURS 596 (2-6 credits)

Financial Aid

A limited number of nurse traineeships are available for premaster's study. Other financial aid is available on a limited basis. Teaching assistantships and research assistantships are available to a limited number of students. Priority for these appointments is given to predoctoral students.

Contact the Academic Services Office, School of Nursing, for current information.

Course Descriptions

See page 582.

College of Ocean and Fishery Sciences

Dean

Arthur R.M. Nowell
207 Ocean Sciences

Associate Dean

Ken Chew

The marine environment has been a dominant factor in the history of the Pacific Northwest from the time of the first Native American settlements to the modern days of aquaculture, container ships, and waterfront condominiums. It is not surprising, therefore, that the University of Washington has a long tradition of commitment to teaching, research, and public service in subjects related to marine and freshwater activities.

The College of Ocean and Fishery Sciences comprises five major units of the University in the marine and freshwater sciences: the Applied Physics Laboratory; the Schools of Aquatic and Fishery Sciences, Marine Affairs, and Oceanography; and the Office of Marine Environmental and Resource Programs, which includes the Washington Sea Grant Program. Each of the units of the College focuses on a different aspect of the aquatic environment, but there is much overlap of interests.

The College offers both undergraduate and graduate instructional programs in fisheries and oceanography, and graduate programs in marine affairs. Undergraduates may pursue complementary joint undergraduate degrees with departments such as Biology, Chemistry, and Earth and Space Sciences in the College of Arts and Sciences. College faculty, staff, and students carry out research in oceans, estuaries, and freshwater lakes and rivers all over the world. Facilities for research and teaching range from ocean-going vessels to well-equipped laboratories and classrooms.

The College also supports career-oriented resources for students to complement traditional course work and research. An annual Career Fair, held each February, brings more than 30 potential employers to campus to meet with students and discuss career possibilities and employment opportunities. A well-equipped Career Center is available for students, providing information about career planning and job opportunities in the marine and freshwater sciences. Northwest WaterWork, a publication of current employment opportunities and internships available in water-related areas, is published by the College as a service to students. Internships are encouraged as a way to help students bridge the transition from the classroom to employment after graduation. The College also supports educational outreach activities and innovative learning technologies.

In 2003, the College had 200 undergraduate and 250 graduate students enrolled, a faculty of 198 members, and a total budget of \$60 million, making it one of the largest institutions of its kind in the nation.

The School of Aquatic and Fishery Sciences provides nationally recognized learning experiences in applied aquatic sciences, with an emphasis on fisheries management and conservation. Faculty, staff, and students have access to the region's wealth of aquatic habitats and living resources as well as synergistic partnerships with other academic programs throughout the nation and the world. Critical program areas in aquatic sciences include aquaculture, physiology and genetics, habitat and species ecology, and quantitative fisheries analyses, management, conservation, and restoration.

The School of Oceanography was established in 1930 for teaching and research focused on coastal and blue-water oceanography. Faculty, staff, and students explore ocean-climate interactions, biological, chemical, and geophysical aspects of deep-sea hydrothermal systems, the oceanography of coastal ecosystems, and other interdisciplinary topics. The School offers graduate degrees and is the only leading oceanography program to offer a bachelor's degree, with approximately 100 undergraduate majors currently enrolled.

The School of Marine Affairs fosters comprehensive, long-term, and anticipatory approaches to marine policy and ocean and coastal management. An interdisciplinary curriculum and interactions with public and private organizations, environmental groups, and regulatory agencies enrich student understanding of contemporary issues in ocean and coastal management. The school provides guidance to all levels of government in the U.S. and abroad; to non-governmental organizations that promote resolution of ocean and coastal issues; and to the marine trades, shipping, and transportation industries.

The Applied Physics Laboratory (APL) is a self-sustaining research center within the College established in 1943 at the request of the U.S. govern-

ment to address urgent wartime problems. Today, as one of only four Navy University Affiliated Research Centers in the country, it is a premier center for research, development, and advanced education in science and engineering. About half of APL's programs are devoted to developing innovative solutions to complex technical problems, primarily related to naval operations. The remaining programs are committed to fundamental research in ocean physics, ocean acoustics, polar science, remote sensing, and medical and industrial ultrasound.

The Washington Sea Grant Program (WSGP) supports a broad range of research, education, outreach, and technology transfer activities on coastal and marine issues, placing particular emphasis on those situations where resources, the environment, and people interact. It works extensively with university and external partners to identify needs and opportunities in the marine environment and to develop projects and partnership programs that address them. WSGP is nationally recognized for its quality, innovation, and positive impact.

Aquatic and Fishery Sciences

116 Fishery Sciences

The School of Aquatic and Fishery Sciences (SAFS) encompasses multidisciplinary programs at the interface between the traditional fields of biology, oceanography, and natural resource management. Primary focus is on aquatic ecology and natural history, conservation, and management of fishery resources and habitats. The scope of aquatic systems ranges from watersheds, rivers and lakes, to estuarine and near-shore shelf systems and biotic communities therein. Core sciences in disease, physiology and genetics have application to fish and invertebrate culture and production. Faculty and student research draws heavily on physical system processes, mathematical and statistical models, species life histories, and community ecology, with frequent relevance and application to critical issues of policy and management. The School's diverse research activities include field programs in behavior, ecology, and conservation, an internationally recognized quantitative science program, and traditional wet-lab sciences including aquatic microbiology, diseases, genetics, reproduction, and endocrinology. SAFS is a vibrant academic program presently composed of 28 faculty, 120 graduate and 115 undergraduate majors, and skilled support staff. The School is at the center of many societal controversies related to aquatic systems and resources linked inter alia to the Endangered Species Act, to requirements for protecting essential fish habitat, and to statutes in the Magnuson-Stevens Fishery Conservation and Management Act. The faculty serve on numerous national and international committees and panels in influential roles that shape and guide decisions affecting most aspects of aquatic sciences.

Undergraduate Program

Adviser
116 Fishery Sciences, Box 355020
206-543-7457
safs@u.washington.edu

The School of Aquatic and Fishery Sciences (SAFS) offers the following programs of study:

- * The Bachelor of Science in Aquatic and Fishery Sciences
- * A minor in aquatic and fishery sciences

The School's undergraduate program has been substantially modified in recent years to reflect student and faculty interests in ecology and conservation biology, as well as more traditional fields such as stock assessment and fishery management. Faculty dedication to teaching, substantial benefit gained in close faculty contact within a relatively small program, and significant experiential training and research have made SAFS an appealing major that has doubled in recent years. The Bachelor of Science degree provides an underpinning in sciences such as biology, chemistry and math/stats, then adds a core curriculum within aquatic sciences. Students study within areas of individual interest, grouped in three primary areas: aquatic ecology, conservation and management of aquatic resources, and biology and culture of aquatic animals.

Bachelor of Science

Suggested First- and Second-Year College Courses: Calculus and either the chemistry or biology series the first year, followed by the other series immediately following. English composition, public speaking, and FISH 250 or FISH 101.

Department Admission Requirements

Students in good academic standing may declare this major at any time, including on their application for admission to the UW. After notification of admission and before registration, new students should visit or email the Student Services Office for help in planning their programs.

Graduation Requirements

180 credits, to include 44 credits in FISH-prefix courses; 44 credits of Natural World; 15 credits of mathematics; 10 credits each of Individuals & Societies and Visual, Literary, & Performing Arts; 12 credits of Writing; and 45 credits of free electives.

The Natural World

Minimum of 44 credits, to include:

Biological Sciences: BIOL 180, BIOL 200, BIOL 220 (5, 5, 5); or BIOL 201, BIOL 202, BIOL 203 (5,5,5); or BIOL 101-BIOL 102 or BIOL 161-BIOL 162 and GENOME 371 or FISH 340/BIOL 340 (5-5, 5). One of BIOL 356 (3), FISH 447 (3), or BIOL 473 and BIOL 474 (3,2).

Physical Sciences: PHYS 114, PHYS 115 (4,4), OCEAN 210 (3). Option A: CHEM 142, CHEM 152, CHEM 162 (5,5,6), and CHEM 220 (5) or CHEM 223 and CHEM 224 (4, 4); Option B: CHEM 120, CHEM 220, CHEM 221 (5, 5, 5).

Mathematics and Statistics

Minimum of 15 credits beyond MATH 120, to include Q SCI 291, Q SCI 292 (5, 5) or MATH 124, MATH 125 (5, 5) or MATH 144, MATH 145 (5,5). Q SCI 381 (5).

General Education

Individuals & Societies (I&S): Minimum of 10 credits to include one course (3 credits minimum) in economics and one course (3 credits minimum) in law, policy, or ethics. See adviser for list of acceptable courses.

Visual, Literary, & Performing Arts (VLPA): Minimum of 10 credits.

Writing Proficiency: Minimum of 12 credits, to include 5 credits of English composition drawn from the University list, and at least 7 additional credits of writing-intensive (W) courses.

Major Requirements

Minimum of 44 credits to include FISH 210, FISH 310, and FISH 311 (5,5,5); one from FISH 312 (5), FISH 323 (5), or FISH 324 (5); 18 additional credits of upper-division FISH courses, including 12 credits in the student's chosen focus area; FISH 494 and FISH 495 (3-9,3).

Minor

Minor Requirements: Minimum of 28 credits to include FISH 210 (5); two from FISH 310 (5), FISH 311 (5), FISH 312 (5), FISH 323 (5) and FISH 324 (5); Q SCI 381 (5) or Q SCI 482 (5); minimum of two upper-division FISH courses totaling at least 8 credits.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The study of aquatic and fishery sciences emphasizes a variety of analytical, quantitative, communication, and technical skills. Coursework provides rigorous undergraduate training and experience in both laboratory and field sciences. The School emphasizes skills in the scientific method of inquiry, data analysis, and written/oral presentation of scientific results. Many students are involved in research projects while enrolled, and all students must complete a research-based capstone project under faculty supervision as a degree requirement. The capstone process leads to synthesis of the student's scientific results and other knowledge as

experience is gained in data analysis and writing. Results from the capstone research are presented by students in a public forum, such as the UW Undergraduate Research Symposium or the SAFS Undergraduate Research Symposium. Each year, some undergraduates have their capstone projects published. SAFS graduates pursue careers in the private sector (environmental consulting firms, private companies), the public sector (state and federal agencies, non-profit organizations, non-governmental agencies, education), and many continue into graduate programs either in research or policy. The undergraduate degree prepares students for either direct employment in a number of fields within public and private sectors, or ensures they are competitive for entry into applicable graduate programs worldwide.

* *Instructional and Research Facilities:* The School of Aquatic and Fishery Sciences is housed in several buildings on the University of Washington campus. In addition, the School maintains various facilities off campus, including field research stations in Washington State and Alaska.

o Buildings: The Fishery Sciences Building, housing most of the School's faculty, staff, and graduate students, was completed in autumn 2000, and contains numerous laboratories, offices, and classrooms. Teaching facilities include a large auditorium, several classrooms with state-of-the-art audiovisual equipment, extensive laboratories, and two computer classrooms/labs. The PC Lab is open for general student use when not being used as a classroom. The GIS Lab is mostly used for mathematical/statistical applications and Geographic Information Systems.

The Marine Studies Building is home to the Marine Molecular Biotechnology Laboratory, containing extensive facilities for molecular genetic research.

The Fisheries Teaching and Research building is connected by walkways to the adjacent Marine Studies Building, and houses faculty, staff, and graduate students in laboratory-based disciplines. The Pacific Northwest Regional Fish Collection and its affiliated ichthyological faculty, staff, and students are also housed in the building. Facilities include several new classrooms and teaching laboratories, environmental chambers, and research laboratories.

o Other Facilities:

+ Marine Molecular Biotechnology Laboratory (MMBL): Located in the Marine Studies Building, the MMBL was established in 1993 as a joint facility of the School of Aquatic and Fishery Sciences and the School of Oceanography. It is directed by four faculty who carry out research projects in conservation genetics, molecular ecology, environmental genomics, and phytoplankton ecology. The MMBL is equipped for most types of research in molecular biology, including DNA sequencing and other types of nucleic acid and protein analysis, molecular cloning, and tissue culture. Laboratory facilities include two computerized, laser-based fluorescent imaging systems for DNA sequencing and other forms of genetic analysis, a fluorescence microscope, thermal cyclers, and protein purification equipment.

+ Research and Teaching Hatchery: A salmon return pond and large outdoor raceways are located just south of the Fisheries Center. In the late fall, adult Chinook and Coho salmon return to the pond to complete their life cycle and replenish the natural living resource. The School also maintains a field station at Big Beef Creek on Hood Canal. This station has a native salmon stream plus abundant well water, pristine tidelands, and access to seawater in Hood Canal. Laboratory and housing facilities are available to researchers.

+ University of Washington Fish Collection: The School's Fish Collection, constituting one of five major permanent facilities on the West Coast, includes an extensive array of preserved fishes. Presently, the collection contains more than 230,000 juvenile and adult specimens, and well over 3.3 million eggs and larvae, representing about 3,778 species in 1,419 genera and 310 families. About 25% of the material consists of freshwater species, primarily from Washington, Oregon, and Alaska. The remainder are marine fishes and invertebrates collected mainly in the eastern North Pacific Ocean, from the Aleutian Islands to Baja California, and in the western tropical Pacific, from Christmas Island to Guam and the Philippines. Curators of the collection make specimens available upon request to researchers within and outside SAFS, and provide ichthyological information to the public.

+ Alaska Field Stations: The School maintains six field stations in the Bristol Bay region of Alaska. Two field camps are located at Lake Iliamna (Iliamna, Porcupine Island), one at Chignik Lake, and three

on the Wood River Lakes (Aleknagik, Nerka, Kulik). Each field station features cabins, boats, laboratory space, and equipment to support research activities. The stations are occupied primarily during summer months in support of various types of studies on salmon. The quality of the habitats surrounding the stations ranges from excellent to nearly pristine, and the sites are either within or adjacent to state or national parks. Unlike nearly all salmon populations and most aquatic habitats in the lower 48 states, the fish communities have not been influenced by species introductions, the genetic composition of the populations has not been affected by hatcheries or transplants, and the habitats have experienced no logging or agriculture. The field stations are therefore a unique opportunity to carry out research on relatively undisturbed populations. The School offers a course at these field stations, with the goal to provide a small number of students with direct, hands-on training in the theories and techniques of research in aquatic ecology.

- + Vessels: The School uses various small vessels for instructional and research work, including tow netting, purse seining, and trawling. Training cruises introduce students to shipboard operations.

- * *Honors Options Available:* With College Honors; With Distinction (Departmental Honors). See www.cofs.washington.edu/people/honors.html for requirements.
- * *Research, Internships, and Service Learning:* SAFS scientists work closely with employers in both the public and private sectors, leading to opportunities for undergraduates to receive both internship and research experience. Scientists from area agencies come to the School to attend weekly SAFS departmental seminars. Undergraduates are encouraged to attend. Recently these connections have resulted in research and internship opportunities for SAFS undergraduates at NOAA, National Marine Fisheries, Alaska Fisheries Sciences Center, National Marine Mammal Lab, the U.S. Forest Service, the Student Conservation Association, and the Seattle Aquarium. The College of Ocean and Fishery Sciences is second only to the UW Medical School in federal research dollars brought to the UW campus, providing many paid hourly student positions within the department.
- * *Department Scholarships:* Scholarships are awarded on the basis of academic merit and other factors. The annual application process for continuing students begins in spring; check with the Office of Student Services for applications and deadlines.
- * *Student Organizations/Associations:* SURF (Society for Undergraduate Resources in Fisheries) organizes social, career, and educational activities for undergraduates in Aquatic and Fishery Sciences. SURF also prints t-shirts, welcomes new students to the program, represents the program at events, and collaborates with student groups in other related departments on events.

Of Special Note:

- * The College of Ocean and Fishery Sciences has its own career coordinator who organizes quarterly workshops, an annual career fair, an email list of openings related to the aquatic sciences, and who meets individually with both current students and alumni.
- * Since 1999, the School of Aquatic and Fishery Sciences has sent six students and three faculty members to two Alaska Salmon Field Stations for a six-week course in aquatic ecology. These students receive education in ecology, limnology, population modeling, field techniques, scientific writing, and presentation skills.

Graduate Program

Graduate Program Coordinator
116 Fishery Sciences, Box 355020
206-616-5893
safs@u.washington.edu

The School of Aquatic and Fishery Sciences, established in 1919, offers courses and conducts research on the conservation, management, and effective use of fish and shellfish resources. Education and research in the School include studies of aquatic ecology; ichthyology; population dynamics; management of free-ranging stocks; restoration ecology; aquaculture; seafood quality and safety; and effects of human activities on freshwater and marine ecosystems.

Students may apply for admission into programs leading to the Master of Science or Doctor of Philosophy. Students who apply for the Ph.D. program

must hold a master's degree prior to beginning their doctoral studies. All students who receive a master's degree from the School and wish to pursue a Ph.D. will be reviewed by the Recruitment, Admissions, and Scholarship Committee before being accepted into the Ph.D. program.

Master of Science

Admission Requirements

Minimum requirements for admission to the graduate program in the School are

- * A bachelor's degree from an institution of recognized standing with a minimum GPA of 3.00 in the last two years of college work.
- * Typically at least a 500 on both the verbal and quantitative portions of the GRE and a 5 on the analytic portion (a 500 if taken before October 2002).
- * If an International Student, a minimum TOEFL score of 580 on written exam or 237 on computerized exam.

Degree Requirements

45 credits as follows:

- * School of Aquatic & Fishery Sciences Core Courses:
 - o Q SCI 482 (5)
 - o At least two of the following, for 2 credits each: FISH 510, FISH 511, FISH 512, FISH 513, FISH 514
 - o FISH 521 (4)
 - o FISH 522 (2)
 - o 18 credits of thesis research: FISH 700
- * Additional Course Requirements: At least 12 credits of coursework at the 400 or 500 level are required in addition to the SAFS Core Courses listed above. 4 of the 12 credits must be in 500-level courses. At least 9 of the additional 12 credits must be numerically graded.

Doctor of Philosophy

Admission Requirements

- * Minimum GPA of 3.00 for last two years of graded college work
- * GRE scores of 500 on the verbal and quantitative sections and 5 on the analytical section (500 if before October 2002)
- * For international students not from an English-speaking country, TOEFL scores of 580+ written, 237+ computerized

Admission to the Ph.D. Program After Receiving a M.S. Degree from the School of Aquatic and Fishery Sciences

Students who wish to continue study toward the doctoral degree after receiving a master's from the School must apply to the Graduate Program Coordinator by way of the Student Services Office; the application will be considered by the RASC and a recommendation will then be sent to the director for concurrence or denial. Applications must be submitted by the fifth week of the quarter in which the master's degree is conferred and must consist of the following documentation (students intending to defend in summer quarter should submit their request during the preceding spring quarter, with approval contingent upon degree conference):

- * Three letters of recommendation, including one from the chairperson of the proposed Doctoral Supervisory Committee that, in addition to recommending continued study, guarantees space and financial support for the student for at least the first academic year of study
- * A statement of research intentions from the student
- * Evidence of professional competence and achievement, such as published papers, chapters from the master's thesis, etc.

Bypassing the Master's Degree

Students admitted to the School at the pre-master's level may, under exceptional circumstances, proceed directly to post-master's study. Application should be made to the Graduate Program Coordinator via the Student Services Office for consideration by the RASC. Applications must include the following documentation:

- * A statement from the student that all coursework for the MS Degree has been completed
- * A current transcript
- * A letter from the student's M.S. Supervisory Committee indicating approval to bypass the MS Degree

- * A doctoral dissertation research proposal which has been approved by the chairperson of the proposed Doctoral Supervisory Committee;
- * Evidence that the student has reached a master's level of competence in written completion of research, such as a paper accepted for publication in a peer-reviewed journal

Students who bypass the master's degree must complete all Ph.D. requirements within ten years of beginning graduate study, including M.S. coursework if used to fulfill any Ph.D. requirements.

Degree Requirements

Minimum 90 credits, as follows:

- * SAFS Core Courses: The following core courses are required of all Ph.D. students. They are the same as those required of M.S. students and must be taken as part of the doctoral program if they or their equivalents have not been taken during an M.S. program.
 - o Q SCI 482 (5)
 - o At least two of the following, for 2 credits each: FISH 510, FISH 511, FISH 512, FISH 513, FISH 514
 - o FISH 521 (4)
 - o FISH 522 (2)
 - o 27 credits of doctoral dissertation: FISH 800 (a maximum of 10 dissertation credits may be taken in any one academic quarter)
- * Additional Course Requirements: At least 48 credits of coursework at the 400 level or above, including dissertation credits, are required in addition to the required core courses listed above. Of those, at least 9 credits must be numerically graded.

Financial Aid

General information on graduate student support is available from the Office of Student Financial Aid, 105 Schmitz. The majority of first-year graduate students are offered research assistantships by appropriate faculty members, depending on the availability of research funding. The School of Aquatic and Fishery Sciences also has a limited number of fellowship opportunities for outstanding entering students. Other students may have their studies supported by the agency for which they work or they may be international students with scholarships from their home countries.

Graduate applicants are urged to discuss their financial needs with professors in their potential major fields during the early stages of the graduate application process. The graduate applicant will automatically be considered for any fellowships, research assistantships, or teaching assistantships available from the School of Aquatic and Fishery Sciences when the admissions application is submitted.

Course Descriptions

See page 590.

Marine Affairs

3707 Brooklyn Avenue Northeast

Graduate Program

Graduate Program Coordinator
3707 Brooklyn NE, Box 355685
206-543-4326, 206-543-7004
uwsma@u.washington.edu

The School of Marine Affairs offers an interdisciplinary program of study leading to the Master of Marine Affairs degree. Marine affairs concerns management and policy questions on the uses of the coastal and offshore regions of the ocean and their resources. The core curriculum includes courses from marine affairs, economics, law, marine sciences, and public affairs.

Master of Marine Affairs

The School of Marine Affairs offers an internationally recognized master's degree program for launching careers in marine policy and administration. Students learn creative approaches to resolving marine problems and conflicts, charting rational use of living and non-living marine resources, and

managing human activities on the coasts, at sea, and in estuaries, wetlands, and large inland bodies of water.

A major program objective is to prepare students for professional careers in policy making, management, teaching, and research. Breadth of study is emphasized, and all students are expected to gain familiarity with relevant aspects of the social, technological, and environmental sciences. In addition, each student is expected to develop a professional and scholarly proficiency in a particular aspect of marine affairs.

Completion of the M.M.A. program normally requires two academic years for students who have received a baccalaureate degree. During the first year, students develop a comprehensive understanding of the marine affairs field and acquire analytic skills. During the second year, a special competence is developed in a topical area of interest (e.g., ocean and coastal management, ports and marine transportation, marine environmental protection, marine resources management, ocean and coastal tourism and recreation), and a thesis is prepared and presented under the guidance of a faculty supervisory committee. Individual courses of study may be adjusted to accommodate prior experience and academic background. Mid-career and other qualifying students can apply to follow a non-thesis track emphasizing additional coursework and a degree project.

Admission Requirements

Admission to the School of Marine Affairs is based on evaluation of required application materials in competition with other applicants. Required materials include Graduate Record Examination general-test scores, completed departmental supplementary information form, three letters of recommendation, official academic transcripts, and a statement of career objectives. Applicants must apply directly to, and be accepted by, the University's Graduate School. Course sequences begin each autumn quarter, and new students normally are admitted only at that time.

Degree Requirements

59 credits as follows:

- * The Core Curriculum (29 credits minimum)
 - o Introduction to Marine Affairs: SMA 500 (5), SMA 501 (3)
 - o Economics: SMA 536 (3). (Students may be waived by the Graduate Program Coordinator from SMA 536 due to adequate undergraduate training, but are required to take at least one economics course at the 400 or 500 level. The following courses are suggested: SMA 537 (3), SMA 538 (3), ECON 435 (5), ECON 436 (5).)
 - o Marine Law: SMA 506/LAW 561 (3) or SMA 515/LAW 565(3)
 - o Policy Analysis: SMA 519 (3) or PB AF 513 (3)
 - o Policy Processes: one of the following: SMA 507 (3), SMA 508 (3), SMA 521 (3), SMA 523 (3), PB AF 590/CFR 592 (3) (when course content appropriate; check with Graduate Program Coordinator); PB AF 592/FM 571 (5)
 - o Marine Science: SMA 591 (3). (Students may be waived by the Graduate Program Coordinator from SMA 591, but are required to take at least one 400- or 500-level science course. The following courses are suggested: SMA 510 (3); FISH 450 (4); FISH 454 (3); BIOL 472 (5); or BIOL 473 (3).)
 - o Quantitative Skills: one of the following: The required skill level is equivalent to intermediate statistics, including an understanding of point estimates, confidence intervals and regression equations. Students not meeting this requirement through undergraduate classes or experience should take one appropriate course while at SMA. Recommended courses include: Q SCI 381 (5), STAT 301 (5), or STAT 311 (5). (Note: Although 300-level courses do not qualify for graduation credits, the School will waive 3 credits of the 59-credit SMA graduation requirement for students completing one of these courses.)
 - o Social Science Data Collection and Analysis: one of the following: SMA 476 (3), SMA 512 (3), PB AF 507 (3), GEOG 425 (5), or CRF 400 (3)
 - o Marine Affairs Seminar: SMA 550 (3)
- * Electives (20 credits minimum – or 10 additional elective credits for non-thesis track): Elective credits must qualify as graduate credit (typically 400- or 500-level courses) offered in any UW department or school. Students should consult with their advisor or Thesis Committee Chair in choosing a set of elective courses. At least 6 credits, and two courses must come from the following list of SMA courses: SMA 433 (5), SMA 480 (3), SMA 485 (3), SMA 499 (var.) (when subject is African Population, Development and Marine Environment), SMA 509 (3), SMA 510 (3), SMA 514 (3), SMA 516 (3), SMA 517 (3), SMA 540 (3), SMA 555 (3), SMA 581 (3), SMA 550 (1-3) (cannot simultaneously be used to meet core requirements).

- * The Thesis and Thesis Presentation (10 credits minimum – for thesis track students): SMA 700 (minimum 9 credits); SMA 570 (1).
- * Career Skills (non-credit requirement): First year: One career counseling appointment during fall quarter. One resume review session during winter quarter. Second year: One career counseling appointment during fall quarter. One resume review session during winter quarter.

Financial Aid

The School of Marine Affairs has a limited number of positions for graduate student appointments as research assistants. Applicants in need of support are urged to investigate outside sources of funding.

Course Descriptions

See page 593.

Oceanography

108 Oceanography Teaching Building

Oceanography is the study of the marine environment and its interactions with the earth, the biosphere, and the atmosphere. The study is prompted both by the intellectual desire to understand how the oceans move and how life develops in a salty, cold environment, and the need to use wisely the ocean's resources for the benefit of humanity. It is an interdisciplinary science integrating the basic principles of biology, chemistry, geology, physics, geophysics, mathematics, botany, zoology, meteorology, and geography. Applications of high technology to oceanographic instrumentation and vessels, increasingly sophisticated computers, satellite remote sensing, and innovative methodologies are rapidly opening new possibilities for exploration and study. Oceanography is divided into four areas of emphasis:

Biological Oceanography examines the processes governing the distribution, abundances, and production of plants, animals, and nutrients in the oceanic ecosystem. Emphasis is on investigations of bacteria, phytoplankton, zooplankton, and benthic organisms.

Chemical Oceanography investigates the complex chemistry, distribution and cycling of dissolved substances, nutrients, and gases in seawater, the mechanisms controlling them and their origins and fates.

Marine Geology and Geophysics studies marine sediments (their formation, transport, and deposition); ocean basin formation (plate tectonics); processes governing shoreline formation; and the origin, structure, and history of the oceanic crust and upper mantle.

Physical Oceanography endeavors to understand and predict motions in the sea from millimeters through tidal and current scales to the great ocean gyres, the distribution of physical properties (temperature, salinity, sea ice), and air-sea interaction and its implications for climate.

Undergraduate Program

Adviser
108 Oceanography Teaching Building, Box 357940
206-543-5039
student@ocean.washington.edu

The School of Oceanography offers the following programs of study:

- * The Bachelor of Science degree with a major in oceanography
- * The Bachelor of Arts degree with a major in oceanography
- * Specializations include biological, chemical, or physical oceanography, or marine geology and geophysics
- * A minor in oceanography

Bachelor of Arts

Suggested Pre-College Courses: A high school student considering oceanography as a career should be guided by an interest in natural sciences and a good record in high school science courses, particularly mathematics. One year each of biology, chemistry, and physics recommended.

Suggested First- and Second-Year College Courses: BIOL 161- BIOL 162 or BIOL 180, BIOL 200, BIOL 220; CHEM 142, CHEM 152; ESS 101 or ESS 210; MATH 124, MATH 125, MATH 126; PHYS 121, PHYS 122, PHYS 123. Students should complete the calculus, general chemistry, and either the biology or physics sequences before autumn quarter of the junior year.

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Major Requirements

Same as for the Bachelor of Science degree (see below), except only 10 credits of upper-division science, mathematics, or engineering courses are required.

Bachelor of Science

Suggested Pre-College and First- and Second-Year College Courses: Same as for Bachelor of Arts degree (shown above).

Department Admission Requirements

Students in good academic standing may declare this major at any time.

Graduation Requirements

Minimum 180 credits, to include the following:

1. MATH 124, MATH 125, MATH 126; CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123; ESS 101 or 210; and BIOL 161-BIOL 162 or BIOL 180, BIOL 200, BIOL 220 (55-60 credits)
2. OCEAN 200, OCEAN 210, OCEAN 220 (taken for writing credit), OCEAN 400, OCEAN 410, OCEAN 420, OCEAN 430, OCEAN 442, OCEAN 443, OCEAN 444 (taken for writing credit), and one from the following: OCEAN 401, OCEAN 411, OCEAN 421, OCEAN 431 (39 credits)
3. 20 credits of upper-division science, mathematics, or engineering to be selected in the student's area of specialization in consultation with a faculty adviser (20 credits)
4. 20 credits of Visual, Literary, & Performing Arts and 20 credits of Individuals & Societies from the University Areas of Knowledge lists (40 credits)
5. 5 credits of English composition and 10 credits of W (writing) courses. 8 of the 10 credits of University-approved W (writing) courses are included within the curriculum. (7 credits)
6. Free electives to bring credit total to minimum 180.

Minor

Minor Requirements: 25 credits as follows:

1. OCEAN 200, OCEAN 210, OCEAN 220
2. One of the following: OCEAN 400, OCEAN 410, OCEAN 420, or OCEAN 430
3. OCEAN 442
4. 9 credits of OCEAN electives, chosen from 300- and 400-level oceanography courses

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The degree offers students a solid foundation in biological, chemical, geological, and physical oceanography, together with more specialized expertise in one of those options. Expertise is gained through team-based field and laboratory research during the sophomore and junior years, then by independent research on a thesis topic during the senior year. Emphasis is on building skills with the tools and techniques of shipboard oceanographic research and data analysis and interpretation. Students engage in field work and data collection, learn to analyze and interpret that data, and prepare scientific reports. Additionally, students acquire familiarity with the specialized instruments of oceanographic research.

The program is designed to prepare students to enter the profession directly or to pursue graduate studies. Oceanographers seek to produce a new understanding of an ocean system and to explore the potential consequences to the marine environment of human activities. They collect samples and data, analyze and interpret them, and prepare and disseminate the results. They work at sea, on land, in laboratories, and

with computers. Most are employed in education and research institutions and federal, state and local government agencies. Other employers include environmental consulting firms and private companies extracting and harvesting marine products. A degree can also serve as a background for a career in teaching, administration, marine affairs, computing, or environmental studies.

- * *Instructional and Research Facilities:* The School has extensive laboratory facilities equipped with highly specialized instruments and computers for teaching and research. The School operates two research vessels: the 274 foot R/V Thomas G. Thompson, used chiefly for open ocean research throughout the world, and the 65 foot R/V Clifford A. Barnes, used for research in coastal waters and estuaries of Washington. Undergraduate students have ample opportunities to gain research experience in the laboratories of faculty and to do oceanographic research in Puget Sound.
- * *Honors Options Available:* With College Honors; With Distinction (School Honors). See adviser for requirements.
- * *Research, Internships, and Service Learning:* Special opportunities for Oceanography majors are provided by the School's large research program by involving students in undergraduate research projects and part-time employment.
- * *Department Scholarships:* See adviser for availability.
- * *Student Organizations/Associations:* The Student Oceanographic Society (SOS) provides peer advice, organizes field trips, sponsors alumni career panels, and holds social gatherings.

Of Special Note: OCEAN 101 and other transferable lower-division oceanography courses will count as electives and not as part of the major.

Graduate Program

Graduate Student Services
108 Ocean Teaching, Box 357940
206-543-5039
student@ocean.washington.edu

The School of Oceanography provides excellent instruction and research opportunities at the graduate level in all areas: biological, chemical, and physical oceanography, and marine geology and geophysics. The program of study emphasizes independent research in conjunction with basic and specialized courses. Interdisciplinary research is encouraged, and students enjoy the opportunity to work across the usual scientific boundaries. Course work during the first two years is required in each option; specialized course work is structured to fit the student's background and objectives. Foreign-language proficiency is required only when deemed crucial to scholarly research.

Master of Science

The program of study includes course work in the student's area of interest and the other oceanography options, and the completion of an approved research project and oral presentation of the results. Thesis and non-thesis programs are offered; most students select the non-thesis option.

Admission Requirements

- * One official copy of transcript(s) from all colleges or universities attended.
- * Minimum GPA of 3.00 or B for last 90 quarter (60 semester) credits
- * GRE scores
- * TOEFL scores for international students.
- * Statement of goals and objectives, which may include any or all of the following: How or why applicant became interested in oceanography, significant accomplishments, summary of research experience, research area(s) of especial interest, ultimate goals, extracurricular activities and interests.
- * Three letters of recommendation on School of Oceanography forms (downloadable or available upon request). Recommendations should be from faculty or scientists familiar with the applicant's academic achievements and research experience. Include the letters in sealed envelopes (signed on the seal) with other application materials. In unusual circumstances, applicant may have the letter(s) sent separately to the School. Applicants who have been out of school for some time may include recommendations from employer(s), but all efforts should be made to include at least one letter from academic faculty.

Degree Requirements

36-45 credits, as follows:

- * Under the thesis program a minimum of 36 or more quarter credits (27 course credits and a minimum of 9 credits of thesis) must be presented. Under the nonthesis program, a minimum of 36 or more quarter credits of course work is required.
- * At least 18 of the minimum 36 quarter credits for the master's degree must be for work numbered 500 and above. (In a thesis program, 9 of the 18 credits must be course credits and 9 may be OCEAN 700, Masters thesis.)
- * Numerical grades must be received in at least 18 quarter credits of course work taken at the UW. The Graduate School accepts numerical grades (a) in approved 400-level courses accepted as part of the major, and (b) in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
- * A minimum of three full-time quarters of residence credit must be earned. Part-time quarters may be accumulated to meet this requirement.
- * In the thesis degree program, a thesis, approved by the supervisory committee, must be submitted to the Graduate School. A student must register for a minimum of 10 credits of thesis (OCEAN 700). With the exception of summer quarter, students are limited to a maximum of 10 credits per quarter of thesis (OCEAN 700).
- * A final Master's Examination, either oral or written, as determined by the student's supervisory committee, must be passed.
- * Biological Oceanography option: The core curriculum consists of the following courses: OCEAN 530 (3), OCEAN 531 (3), OCEAN 532 (3), OCEAN 533 (3). Master's level students are required to take a minimum of 3 credits of advance biological oceanography courses.
- * Chemical Oceanography option: The core curriculum consists of the following courses: OCEAN 520 (3). Master's level students are required to take a minimum of three advanced chemical oceanography courses.
- * Marine Geology and Geophysics option: The core curriculum consists of the following courses: OCEAN 540 (3), OCEAN 541 (3), OCEAN 545 (3).
- * Physical Oceanography option: The core curriculum consists of the following courses: OCEAN 500 (1), OCEAN 510 (3), OCEAN 511 (3), OCEAN 512 (3), OCEAN 513 (3), OCEAN 514 (3), OCEAN 515 (3), OCEAN 517 (2). Physical Oceanography students are also expected to take a sequence of three courses in Applied Mathematics.
- * Out-of-Option Requirement: A minimum of 12 credits of numerically graded, 500-level courses, 6 credits of which must be taken as 3-credit courses in two options outside a student's option. The remaining 6 out-of-option credits may be in courses in oceanography (outside a student's option) or in a related science selected at the discretion of the student and supervisory committee. These courses must be completed with the first two years of study. A grade of less than a 3.0 in any course will necessitate repeating the course or taking another course in that area as recommended by the student's committee.

Doctor of Philosophy

The degree program places a strong emphasis on research following completion of course requirements and General Examination. Upon successful completion of the General Examination, the student undertakes an original research investigation, which is described in the dissertation and defended during the Final Examination.

Admission Requirements

- * One official copy of transcript(s) from all colleges or universities attended.
- * Minimum GPA of 3.00 or B for last 90 quarter (60 semester) credits
- * GRE scores
- * TOEFL scores for international students.
- * Statement of goals and objectives, which may include any or all of the following: How or why applicant became interested in oceanography, significant accomplishments, summary of research experience, research area(s) of especial interest, ultimate goals, extracurricular activities and interests.

- * Three letters of recommendation on School of Oceanography forms (downloadable or available upon request). Recommendations should be from faculty or scientists familiar with the applicant's academic achievements and research experience. Include the letters in sealed envelopes (signed on the seal) with other application materials. In unusual circumstances, applicant may have the letter(s) sent separately to the School. Applicants who have been out of school for some time may include recommendations from employer(s), but all efforts should be made to include at least one letter from academic faculty.

Degree Requirements

Minimum 90 credits, as follows:

- * Completion of a program of study and research as planned by the graduate program coordinator in the student's major department or college and the Supervisory Committee. Half of the total program, including dissertation credits, must be in courses numbered 500 and above. At least 18 credits of course work at the 500 level and above must be completed prior to scheduling the General Examination.
 - * Presentation of a minimum three years (nine full-time quarters) of resident study, two of them being at the UW with at least one year in continuous full-time residence. The year of full-time residence may be satisfied by completing any three full-time quarters (not necessarily continuous) at the University of Washington and must be completed prior to the General Examination. Residence requirement for the doctoral degree cannot be met solely by part-time study. A minimum of two academic years of resident study must be completed prior to scheduling the General Examination.
- With the approval of the degree-granting unit, an appropriate master's degree from an accredited institution may be applied toward one year of resident study at the UW.
- * Numerical grades must be received in at least 18 quarter credits of course work taken at the UW. The Graduate School accepts numerical grades (a) in approved 400-level courses accepted as part of the major, and (b) in all 500-level courses. A minimum cumulative GPA of 3.00 is required for a graduate degree at the University.
 - * Creditable passage of the General Examination. Registration as a graduate student is required the quarter the examination is taken and candidacy is conferred.
 - * Preparation and acceptance by the Dean of the Graduate School of a dissertation that is a significant contribution to knowledge and clearly indicates training in research. Credit for the dissertation ordinarily should be at least one-third of the total credit. The candidate must register for a minimum of 27 credits of dissertation over a period of at least three quarters. At least one quarter must come after the student passes the General Examination. With the exception of summer quarter, students

are limited to a maximum of 10 credits per quarter of dissertation (OCEAN 800).

- * Creditable passage of a Final Examination, which is usually devoted to the defense of the dissertation and the field with which it is concerned. The General and Final Examinations cannot be scheduled during the same quarter. Registration as a graduate student is required the quarter the examination is taken and the degree is conferred.
- * Completion of all work for the doctoral degree within ten years. This includes quarters spent on leave or out of status as well as applicable work from the master's degree from the UW or a masters degree from another institution, if applied toward one year of resident study.
- * Biological Oceanography option: The core curriculum consists of the following courses: OCEAN 530 (3), OCEAN 531 (3), OCEAN 532 (3), OCEAN 533 (3). Doctor's level students are required to take a minimum of 9 credits of advance biological oceanography courses.
- * Chemical Oceanography option: The core curriculum consists of the following courses: OCEAN 520 (3). Doctor's level students are required to take a minimum of six advanced chemical oceanography courses.
- * Marine Geology and Geophysics option: The core curriculum consists of the following courses: OCEAN 540 (3), OCEAN 541 (3), OCEAN 545 (3).
- * Physical Oceanography option: The core curriculum consists of the following courses: OCEAN 500 (1), OCEAN 510 (3), OCEAN 511 (3), OCEAN 512 (3), OCEAN 513 (3), OCEAN 514 (3), OCEAN 515 (3), OCEAN 517 (2). Physical Oceanography students are also expected to take a sequence of three courses in Applied Mathematics.
- * Out-of-Option Requirement: A minimum of 12 credits of numerically graded, 500-level courses, 6 credits of which must be taken as 3-credit courses in two options outside a student's option. The remaining 6 out-of-option credits may be in courses in oceanography (outside a student's option) or in a related science selected at the discretion of the student and supervisory committee. These courses must be completed with the first two years of study. A grade of less than a 3.0 in any course will necessitate repeating the course or taking another course in that area as recommended by the student's committee.

Financial Aid

Normally all students pursuing a graduate degree are supported by research or teaching assistantships, or by fellowships and scholarships from national or private sources. Most appointments continue through the summer when students are engaged in research.

Course Descriptions

See page 594.

School of Pharmacy

Dean

Sidney D. Nelson

Associate Deans

Nanci L. Murphy

Kenneth E. Thummel

Stanley S. Weber

Established in 1894, the University of Washington School of Pharmacy is proud of its strong commitment to excellence and the recognition given to its faculty and graduates for their outstanding educational, research, and service activities. The School's Dean's Office and three departments -- Medicinal Chemistry, Pharmaceutics, and Pharmacy -- are located in the H-Wing of the Health Sciences Building.

The School of Pharmacy offers a four-year professional program leading to the Doctor of Pharmacy (Pharm.D.) degree. The curriculum is designed to provide students with the scientific background and clinical skills necessary to render pharmaceutical care in a changing health care system. Instructional methods strive to enhance the critical-thinking and problem-solving skills necessary to provide rational drug therapy, promote healthy lifestyles and disease prevention, enhance patient compliance, reduce medication-related problems, and improve health outcomes. The School aspires to foster a commitment to life-long learning and provide an environment where students develop the knowledge, attitudes, and skills consistent with the profession's high standards.

Students have the opportunity to pursue elective choices to design a program compatible with individual areas of interest. Dual degree options include the Pharm.D./Ph.D. programs in Pharmaceutics and Medicinal Chemistry, the Pharm.D./M.S. program in Pharmaceutical Outcomes Research and Policy, and the Pharm.D./Physician Assistant program. Students also have the option of earning the Geriatric Certificate in Pharmacy Practice, the Pharmacy Management Certificate, and the Biomedical Regulatory Affairs Certificate concurrently with their degree. In the final year of the program students complete experiential training at a variety of practice settings. The School of Pharmacy is a member of the American Association of the Colleges of Pharmacy and its programs are accredited by the American Council on Pharmaceutical Education (www.acpe-accredit.org).

Consideration for admission to the professional program requires a minimum of two years of prepharmacy training. An applicant who is admissible to the University is not assured admission to the School of Pharmacy. Admission is competitive and based on a number of factors. Academic preparedness, motivation, oral and written communication skills, critical-thinking ability, and decision-making skills are among the criteria used to determine a candidate's aptitude for the pharmacy program. Following a preliminary assessment of the applicant pool, the most-qualified applicants are selected for an interview in Seattle. A writing assessment is also conducted at that time. Further details on admission requirements, application procedures, and program content may be obtained from the School's Office of Academic and Student Programs or its Web site.

The School also seeks to promote the life-long learning of pharmacists by offering opportunities for post-graduate education and continuing-education seminars. An external Pharm.D. program is available for those pharmacists who would like to pursue an advanced degree beyond the baccalaureate degree. Continuing-education programs are provided throughout the year to meet the needs of the community.

To foster the interests of students who seek to engage in creative discovery and research, the School also offers graduate education leading to the M.S. and/or Ph.D. degrees in medicinal chemistry, pharmaceutics, or pharmaceutical outcomes research and policy.

Medicinal Chemistry

Graduate Program

Graduate Program Coordinator
H164 Health Sciences, Box 357610
206-543-2224
medchem@u.washington.edu

The Department of Medicinal Chemistry offers programs of graduate study leading to the degrees of Master of Science and Doctor of Philosophy. The primary mission of the program is to train versatile scientists for careers in the pharmaceutical and medical sciences. To this end, graduates of the program acquire a broad knowledge base in medicinal chemistry, pharmacology, and biochemistry, which is important in the rapidly evolving, multidisciplinary biomedical arena. The department further offers diverse opportunities for research at the interface between biology and chemistry, with emphasis on issues of biomedical importance.

Graduates of the program acquire the skills necessary to develop quantitative and qualitative methodologies necessary for the study of biochemical processes that occur at the cellular and subcellular levels. These include the elucidation of biochemical transformations and interactions using techniques such as protein engineering, molecular modeling and dynamics as well as a broad array of supportive spectroscopic techniques including mass spectrometry and NMR.

One major area of research interest is the role of biotransformation processes in the toxification and detoxification of drugs and environmental contaminants. A second area of interest is the determination of protein and small ligand structure and function using computational methods, NMR, mass spectroscopy, and other biophysical techniques. Issues of biomedical importance include elucidation of mechanisms of drug-induced cell toxicity, drug-drug and drug-herbal interactions, identification of enzyme attributes that dictate substrate specificity and catalytic mechanism, pharmacogenetics, structural immunology in vaccine design, biotherapeutics, proteomics, and protein folding in disease states.

Most students proceed directly to the doctoral degree program. Successful completion of a series of cumulative examinations and at least two quarters of teaching experience are among the requirements for completion of the doctoral program.

Admission Requirements

Students who intend to work toward the Doctor of Philosophy degree must apply for admission to the Graduate School and meet the requirements outlined in the Graduate Study section of this catalog. Graduate students must satisfy the requirements for an advanced degree in force at the time the degree is to be awarded. Graduate study requires approval of the Graduate School and the Department of Medicinal Chemistry.

Special Requirements

Students with undergraduate degrees in pharmacy or in the biological or physical sciences are accepted for graduate study in medicinal chemistry. Undergraduates who plan to pursue graduate study are encouraged to expedite their programs by selection of pertinent electives. Although the choice of electives varies with the student's ultimate goals, graduate study in medicinal chemistry requires an adequate background in biological and physical sciences.

Master of Science

A student in the master's degree program must present at least 27 credits of course work, inclusive of thesis and non-thesis research. The student also must complete a research project, prepare an acceptable thesis, and pass a final examination.

Doctor of Philosophy

90 credits minimum, as follows:

Coursework requires graduate students to achieve a level of proficiency in organic, medicinal and physical chemistry, pharmacology, biochemistry, and molecular biology. Most course work is completed in the first two to two and a half years of the graduate program. The program is flexible and easily adaptable to meet individual interests and needs.

In the first year of the program, students rotate through the laboratories of at least two faculty members. At the end of the first year, the student chooses a faculty sponsor and a dissertation research project.

* *First year:* CHEM 530, CHEM 531, CHEM 532 (3, 3, 3); MEDCH 501, MEDCH 502, MEDCH 503 (4, 4, 4); MEDCH 520 (1 credit each quarter); MEDCH 582 (1 credit each quarter); MEDCH 600

- * *Second year:* BIOC 530 (3); BIOST 511 (4); MEDCH 450, MEDCH 451 (3, 3); MEDCH 525 (3); either MEDCH 527 (3) or MEDCH 528 (3); MEDCH 541 (3); PHCOL 402, PHCOL 403 (4, 4); MEDCH 520 (1 credit each quarter); MEDCH 582 (1 credit each quarter); MEDCH 600
- * *Third year:* PCEUT 406 (4); MEDCH 520 (1 credit each quarter); MEDCH 582 (1 credit each quarter); MEDCH 600 (7 credits each quarter)
- * *Fourth year:* MEDCH 700 or MEDCH 800

Financial Aid

Financial support in the form of research assistantships and fellowships may be available to students in good standing throughout their graduate careers. Availability of financial support varies from year to year, and prospective applicants should contact the graduate program coordinator for additional information.

Course Descriptions

See page 598.

Pharmaceutics

Graduate Program

Graduate Program Coordinator
H272 Health Sciences, Box 357610
206-543-9434
pceut@u.washington.edu

The Department of Pharmaceutics offers programs of graduate study leading to the Doctor of Philosophy degree.

Program Description

The program provides research training in the fundamental aspects of drug disposition, drug delivery, and drug action in animals and man. Drug disposition includes the phenomena of absorption, distribution, and elimination. Pharmacokinetics is the study of the time course of these processes and the time course of pharmacological effects. Drug delivery includes targeting of drugs to tissues or specific cells to improve their therapeutic effect. These areas of research have a wide range of applications, particularly in the pharmacological characterization of new drug molecules in pharmaceutical development. Graduates of this program possess expertise in a variety of analytical techniques and the elaboration of mathematical models to describe drug disposition and pharmacological processes.

The department's research program includes seven NIH-funded laboratories addressing a variety of fundamental and clinical problems pertaining to drug transport, metabolism, and toxicity associated with several diseases (AIDS, cystic fibrosis, leukemia, epilepsy), as well as pain management and transplantation. Most projects involve collaborative arrangements with investigators from other departments in the University or at the Fred Hutchinson Cancer Research Center. The collaborative relationship of the faculty of the Departments of Pharmaceutics and Medicinal Chemistry in the field of drug metabolism has received worldwide recognition.

Thesis research can involve experimental animal work, in vitro studies, clinical investigation, or a combination of approaches. Graduate students are given the opportunity to participate in interdisciplinary research, providing an added dimension to their training.

A wide range of career paths are available to graduates of this program. Opportunities include research in the pharmaceutical industry; research in hospitals, institutes, and foundations; teaching and research in academic institutions; and positions with government regulatory agencies.

Doctor of Philosophy

Admission Requirements

- * One copy of official transcripts in a sealed envelope from each college attended
- * Official GRE score report
- * All foreign students must take the TOEFL and TSE test and send in the official score report

- * Statement of personal goals describing your background, academic interests, and career objectives
- * A résumé or curriculum vitae listing educational and employment history
- * Three letters of recommendation from persons who are in a position to evaluate your potential for graduate school.

Degree Requirements

The degree program requires a minimum of 90 credits of coursework. The following include a combination of pertinent Graduate School and Department requirements for the Ph.D. degree in Pharmaceutics:

- * **Credits and Scholarship:** A minimum of 41 credits of course work, exclusive of thesis and non-thesis research, must be satisfied. An average grade point average of 3.00 in all numerically graded courses numbered 300, 400, and 500 is required. A minimum passing grade in any given course is 2.7, except required pharmaceutics courses (PCEUT 506, PCEUT 501, PCEUT 503, PCEUT 504, PCEUT 505) in which a passing grade is 3.0. Credits earned for a master's degree may apply towards the doctoral degree.
 - * **Teaching experience:** A minimum of two quarters of teaching-assistantship experience is a required component of the training for the Ph.D. degree.
 - * **Examinations and Progress Evaluation:** All graduate students must participate in the departmental examination program. A series of cumulative examinations and a general (oral) examination is required for advancement to Ph.D. candidacy, and a final examination (defense of the thesis) is required for the degree.
 - * **Master Degree Bypass:** Students who qualified for continuation to the Ph.D. degree may be allowed to bypass the MS degree.
 - * **Seminars:** All graduate students must present a minimum of four seminars while in residence (PCEUT 520). In addition, presentation of papers from current literature is required twice a year starting at the beginning of the second year until defense of the thesis (PCEUT 583).
 - * **Didactic Training:** The program of course work is divided into four components: (1) prerequisites which define the level of entry into the program; (2) a core program which is analogous to the major; (3) several elective pathways, one of which is required and is analogous to the minor; (4) seminars and literature review.
1. Prerequisites:
 - o Differential calculus -- MATH 124 (5)
 - o Pharmacology -- PHCOL 401, PHCOL 402, PHCOL 403 (3, 3, 3) or medicinal chemistry -- MEDCH 440, MEDCH 441, MEDCH 442 (3, 3, 3). Waived for pharmacists.
 - o Biochemistry/microbiology -- MICROM 301, MICROM 302 (3, 2).

Most students with a B.S. in pharmacy or Pharm.D. should have fulfilled these requirements prior to entering the program. Applications from students who do not have a pharmacy background are strongly encouraged. However, these candidates are accepted into the program on the condition that their deficiencies in course requirements be rectified by the end of the first academic year.

2. Core Program: This graduate core consists of the following disciplines and specific courses: PCEUT 506 (2), PCEUT 501 (5), PCEUT 502 (4), PCEUT 503 (4), BIOST 511 (4), BIOST 512 (4), T C 509 (3), PCEUT 600, PCEUT 700, PCEUT 800 (variable credits).

The above core courses are considered essential for all students in the program. It is unlikely that any of these courses would be waived, except for students entering with previous graduate-level course work in the required areas. In addition, all students must attend the following training sessions, preferably in the first academic year: Radiation Safety, Chemical Safety, Biological Safety, Animal Care and Bio-ethic training.

3. Directed Electives: The purpose of this group of courses is to provide students with an in-depth exposure in an area of specialization or a minor. Elective courses should be chosen to suit individual interests. Students can select one of the following four pathways and must take the equivalent of 12 cr for each elective pathway. A listing of courses that the student plans to take as an elective pathway must be presented with a justification (course descriptions, etc.) to the department chair before the end of the autumn quarter of the second year in the program.

4. Seminars and Literature:

- o Review PCEUT 520: Seminar (1 cr/quarter; 3 qtr/year until graduation). Beginning the second year, students are to make one presentation each year until graduation with a maximum of four presentations. A general topic seminar is presented in the second year and at least one research seminar when the advisor recommends; a final thesis presentation prior to graduation.
- o PCEUT 583: Journal club(1 cr/quarter; 3 qtr/year until graduation). Students are to make two presentations each year until graduation. Journal club presentations are to begin at the second academic year, except for the quarter that the student is scheduled to present a PCEUT 520 seminar series.
- o PCEUT 507: Drug therapy topics (1 cr./qtr, 3 qtr/for first 2 years).

5. Research: PCEUT 600, PCEUT 700, PCEUT 800 (variable credits). Students must choose thesis advisor by the end of spring quarter in their first academic year. Students must begin their laboratory research by the summer quarter of their first academic year in the lab of their advisor. Due to the course work and research demands, most students may find the after class and off hours to be the best and most productive time for their laboratory research.

6. Cumulative Examination: Students are to begin taking cum exams in the autumn quarter of their second academic year and are to continue taking them at every offering until completion of pass requirements or until they take the maximum of twelve exams. Two exams will be offered each autumn, winter and spring quarter. For each exam, there will be three questions offered and two are to be answered. Students must pass five of twelve exams to complete cum requirements (fifth exam waived if student passes the first 4 exams) to continue their pursuit of the Ph.D. degree. The students that do not achieve this goal is required to complete requirements for a terminal master degree.

Financial Aid

All students in the program receive financial support in the form of research assistantships, Public Health Service predoctoral training fellowships and other fellowships such as the William E. Bradley Graduate Fellowship and those from the American Foundation for Pharmaceutical Education and from several pharmaceutical companies.

Course Descriptions

See page 599.

Pharmacy

Graduate Program

Graduate Program Coordinator
H375 Health Sciences, Box 357630
206-616-1383

The Department of Pharmacy offers graduate training leading to either the Master of Science or Doctor of Philosophy degree.

The graduate program in pharmaceutical outcomes research in the Department of Pharmacy provides M.S.- and Ph.D.-level training with a focus on economic evaluation of pharmaceuticals, pharmacoepidemiology, and drug-policy evaluation. Pharmaceutical outcomes research is the study of the health and cost consequences of pharmaceuticals and pharmaceutical-related policies on individuals and populations. Graduates of this program are trained to assess the use, outcomes, and cost of pharmaceuticals and pharmaceutical policies and practices. Students are prepared for careers in (1) teaching and research in colleges and universities; (2) pre- and post-marketing efficacy and safety; (3) policy analysis for industry, health insurance, and governmental agencies; and (4) drug-use management and evaluation within managed health-care organizations.

Doctor of Philosophy

Admission Requirements

- * One copy of official transcripts from each college attended outside the United States. Transcripts from U.S. institutions are required by the department only.

- * Official GRE Scores.
- * For international students for whom English is not the native language, TOEFL and TSE scores.
- * Statement of personal goals describing the student's background, academic interests, and career objectives
- * A resume or curriculum vitae listing educational and employment history.
- * Three letters of recommendation from persons in a position to evaluate the applicant's potential for graduate school. At least one recommendation must be from a person at the last school attended for full-time study, unless the applicant has been out of school for five years or longer. Referees should return their recommendations directly to the Department of Pharmacy in sealed envelopes with signatures over the seals.

Degree Requirements

90 credits, as follows:

- * Core courses: Epidemiology – EPI 512 (4), EPI 513 (4), BIOST 511 (4), BIOST 512 (4), BIOST 513 (4), PHARM 532 (4), PHARM 533 (3), PHARM 534 (3), PHARM 535 (3)
- * Electives: A sufficient number of electives to meet program credit requirements, determined in consultation with adviser to meet the student's interests and focus
- * General Exam
- * Dissertation and Final Exam

Doctor of Pharmacy

A four-year professional program leading to the Doctor of Pharmacy (Pharm.D.) degree, the curriculum is designed to provide students with the scientific background and clinical skills necessary to render pharmaceutical care in various health care setting. Students must pass a state licensure examination to qualify for practice as a pharmacist.

Admission Requirements

- * Two years of undergraduate coursework at any accredited college or university, to include the following: general biology with labs (15 credits); microbiology with lab (5); general chemistry with labs (15); organic chemistry with labs (17); English composition (10); calculus (5); statistics (4-5); humanities (10); social sciences (10).
- * Minimum 3.00 prerequisite-course GPA and cumulative 3.00 GPA for all college courses.
- * Pharmacy experience is highly recommended, either as volunteer or work experience. Students unable to gain pharmacy experience should consult with several pharmacists regarding the profession (e.g., what it involves, career opportunities, current issues and challenges).
- * Pharmacy College Admission Test (PCAT) must be taken within two years of application. Applicants must request that PCAT scores be sent directly to PharmCAS, not to the UW School of Pharmacy. Sending scores to UW will cause an application to be considered incomplete. The UW School of Pharmacy accepts no other admission test (e.g., MCAT, GRE) in place of the PCAT.
- * Non U.S. Citizens: Applicants who hold permanent resident visa status are eligible to apply. TOEFL scores are not required.
- * International Transcripts: All transcripts for coursework completed at foreign colleges or universities must be translated and evaluated course-by-course by one of the following certified agencies: the Education Credential Evaluators, World Education Services, Inc, or Educational-Perspectives.
- * Foreign Pharmacy Graduates: International students who hold a five-year undergraduate pharmacy degree conferred by a recognized school of pharmacy outside the 50 United States, the District of Columbia, and Puerto Rico may consider taking the Foreign Pharmacy Graduate Equivalency Examination in lieu of pursuing the Pharm.D. degree program. Refer to the NABP website (www.nabp.net) for more information.
- * The Foreign Pharmacy Graduate Examination Committee (FPGEC), which operates under auspices of the National Associate of Boards of Pharmacy (NABP), provides the FPGEC Certification Program as a means of documenting the educational equivalent of a candidate's foreign pharmacy education, as well as the license and/or registration. Candidates are required to pass the FPGEC, the Test of English as a Foreign Language (TOEFL), and the Test of Spoken English (TSE). The FPGEC Certificate allows foreign graduates partially to fulfill eligibility requirements for licensure in the states that consider such certification.

Degree Requirements

192 credits, as follows:

- * Theory and methods (109 credits): CONJ 401 (4), CONJ 402 (4), CONJ 403 (4), MEDCH 401 (4), MEDCH 402 (3), MEDCH 403 (3), MEDCH 404 (3), MEDCH 450 (3), MEDCH 451 (3), PCEUT 331 (4), PCEUT 405 (5), PCEUT 406 (3), PHARM 304 (3), PHARM 309 (3), PHARM 334 (3), PHARM 335 (4), PHARM 403 (2), PHARM 412 (3), PHARM 439 (2), PHARM 440 (3), PHARM 479 (4), PHARM 509 (2), PHARM 541 (3), PHARM 543 (4), PHARM 560 (10), PHARM 561 (9), PHARM 562 (9), PHARM 574 (1), PHCOL 401(3), PHCOL 402 (3)
- * Electives (38 credits): Refer to the School of Pharmacy's website for a list of professional electives
- * Practicum (45 credits): To be completed in the last year of the program

Financial Aid

Financial support in the form of research assistantships, teaching assistantships, and fellowships may be available to prospective and continuing students. Availability of financial aid is limited, typically to the first and second academic year. Prospective students should contact the graduate program coordinator for more information on financial support.

Course Descriptions

See page 600.

Daniel J. Evans School of Public Affairs

Dean

Sandra O. Archibald
208E Parrington Hall

Associate Dean

William M. Zumeta
231 Parrington Hall

The Daniel J. Evans School of Public Affairs is a graduate professional school providing education and research for the public service. The school confers the Master of Public Administration (M.P.A.) degree with day, Peace Corps Master's International, and evening program options. The Evans School's program of study is designed to train highly skilled managerial leaders and policy analysts for a wide range of careers in the public and nonprofit sectors. The academic and professional orientation of the degree program gives Evans School students the knowledge and skills necessary to make significant contributions to regional, national and international policy.

Graduates hold leadership positions such as mayors and city managers; local and regional government administrators; foreign service officers; senior military and public safety positions; assistants to elected officials; analysts with budget offices, legislative staff units, and city councils; directors of social service agencies; leaders and staff of nonprofit organizations and administrators of arts organizations. In addition, a number of alumni are employed in private sector positions involving substantial contact with public agencies.

Graduate Program

Graduate Program Coordinator
109 Parrington Hall, Box 353055
206-543-4900
evansuw@u.washington.edu

Master of Public Administration

Day Program

The M.P.A. program is designed for present and future leaders of the public and nonprofit sectors. The program emphasizes broad-based public policy analysis and management knowledge, while students pursue one or more specialized policy fields known as Gateways. The core devotes considerable time to mastering the basic analytic and managerial skills needed by good analysts and managers. The curriculum draws upon the wide range of academic disciplines throughout the University of Washington.

Full-time day students complete 60 credit hours of course work, encompassing the core requirements, an internship and a degree project. They generally take two academic years (six quarters) to complete the degree program. Part-time and Evening Degree students typically take three or more academic years to complete the M.P.A.

The M.P.A. program has five major components:

- * the Required Core Curriculum;
- * concentrated study in the three curricular areas of study: Economics, Analysis, and Values;
- * specialized plan of study chosen from one or more of the following gateways: Education and Social Policy, Environmental Policy, International Affairs, Nonprofit Management, or Urban and Regional Affairs;
- * a final degree project; and
- * an internship.

Peace Corps Master's International

Peace Corps Master's International (PCMI) students undertake a concentrated 51-credit curriculum, including a full tour of Peace Corps service. The required course work can be completed in a total of four or five quarters. One year of course work must be completed prior to leaving for Peace Corps service. While on assignment overseas, students remain in touch with their faculty adviser and a returned volunteer from the Evans School. PCMI participants return to the Evans School for one term at the end of their international service to complete their course work and final project report.

Mid-career Evening Degree Program

Facing immense social and economic challenges, public and nonprofit leaders must reinvent the meaning of public service. Midcareer professionals with a commitment to public service and seven to 10 years of progressively responsible work experience in the public, nonprofit, or private sectors are offered the MPA degree through the Midcareer Degree Program. This program enables these students, who are typically midlevel managers, to work full time while developing the leadership and analytic tools needed to attain higher leadership positions within their organization or field. Students work through the Midcareer Degree Program with a cohort of their peers. The program blends academic and professional perspectives to engender a practical orientation to the theories, values, and analytical and managerial skills critical to success in public life.

Mid-career students must successfully complete 54 credits of graduate coursework to receive the M.P.A. degree. Degree requirements are divided between the integrated core sequence, electives, and leadership seminars. Students usually take two evening courses each quarter and graduate in three years. Mid-career students do not have an internship or degree project requirement. Although summer attendance is not required, some students take electives during the summer quarter to reduce academic year course loads.

Degree Requirements

54 credits, as follows:

- * Core Sequence (24 credits): PB AF 511 (3), PB AF 512 (3), PB AF 516 (3), PB AF 522 (3), PB AF 523 (3), PB AF 527 (3), PB AF 528 (3), PB AF 596 (3)
- * Electives (23 credits): Mid-career students have great flexibility in designing a course of study that best suits their professional needs and interests. Students may mix their elective courses in substantive policy areas such as environmental or social welfare policy with more practice-based management courses. Students may choose their elective courses from any department within the University in consultation with their advisor. One elective must be a course on ethics or values.
- * Leadership Seminar (7 credits): PB AF 543 (3), PB AF 544 (1-3, max. 3), PB AF 545 (3)

Concurrent Degree Programs

In addition to the day M.P.A. program, the Evans School offers five concurrent M.P.A. degree programs: Master of Arts in International Studies (M.A.I.S.), Master of Urban Planning (M.U.P.), Master of Science in Forest Resources (M.S.), Juris Doctor (J.D.), and Master of Public Health (M.P.H.).

Master of Public Affairs and Master of Urban Planning Concurrent Degree Program

Modern urban problems include community development, environmental quality, transportation, and growth management. These issues are at the intersection of policy, planning, and management and require leaders with skills beyond traditional disciplinary boundaries. This concurrent degree melds together the curricula of two areas critical to effective community leadership in both planning and policy work.

The Evans School of Public Affairs and the Department of Urban Design & Planning of the College of Architecture and Urban Planning offer this concurrent degree that enables students to earn both the MPA and MUP in approximately three years, rather than the four it would take to earn them separately. By combining the strengths of each school, the concurrent program creates:

- * an integrated curriculum with knowledge and skills-based training in organizational management, policy analysis, urban planning, and community development,
- * a collaborative, interdisciplinary program where graduate students from different backgrounds contribute to each other's educational experiences, and
- * practical experience and detailed analysis through a thesis, whereby students demonstrate competency in both areas of the concurrent degree.

Degree Requirements

All students in the program are required to take the courses listed in the Joint Core, Urban Planning Core and Public Affairs Core. Students also must choose one course from a list in each Restricted Electives area. 70 credits minimum, as follows:

- * The Joint Core
 - o Public Affairs Gateway Base Course
 - o Urban Design and Planning Specialization or Certificate Course
- * Urban Planning Core: URBDP 479 (3), URBDP 500 (4), URBDP 503 (3), URBDP 507 (4), URBDP 512 (3), URBDP 580 (3)
- * Public Affairs Core: PB AF 511 (3), PB AF 512 (3), PB AF 513 (3), PB AF 516 (3), PB AF 522 (3), PB AF 527 (3)
- * Restricted Electives (one course each area): Land Use/Growth Management, Specialized Planning Studio, Analysis, Values, Economics, Conflict Resolution
- * Internship: Students complete a graduate-level internship equivalent to three months of full-time work.
- * M.U.P. Thesis Requirement: Students in the concurrent M.P.A./M.U.P. program complete a combined urban planning thesis/professional project and public affairs degree project.

Master of Public Affairs and Master of Arts in International Studies Concurrent Degree Program

Degree Requirements

60 credits minimum, as follows:

- * International Studies Requirements
 - o Language: Proficiency equivalent to two years of college level work in a modern foreign language (three years for Chinese and Japanese).
 - o Required Core: Colloquia in International Studies (three quarters); SIS 500 (3), SIS 501 (3), SIS 502 (3), SIS 511 (3), intermediate economics (option to waive)
 - o Electives: Two fields of study: the professional field must be completed by courses relevant to both programs; the second field can be either a regional studies field or a special topics field.
 - o Final Papers and Oral Exam: Students present two research papers to a faculty examining committee.
- * Public Affairs Requirements
 - o Core Curriculum: PB AF 511 (3), PB AF 512 (3), PB AF 513 (3), PB AF 516 (3), PB AF 522 (3), PB AF 527 (3), PB AF 528 (3)
 - o Restricted Electives (9 credits): economics (3 credits), analysis (3 credits), values (3 credits)
 - o Plan of Study: 15 credits generally from one or a combination of the following gateway courses: International Affairs, Environmental Policy and Natural Resources Management, Urban and Regional Affairs, Education and Social Policy, Nonprofit Management
 - o Internship: Students complete a graduate-level internship equivalent to three months of full-time work.
 - o Degree Project: Students produce a degree project which can be used as one of the two final papers required by the International Studies program if it has an international focus.

Master of Public Affairs and Master of Science in Public Health Concurrent Degree Program

Degree Requirements

90 credits, as follows:

- * Public Affairs Requirements
 - o Core courses: PB AF 510 (1); PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3)
 - o Restricted electives: ENV H 577 (3); either HSERV 585 (3), HSERV 587 (3), or HSMGMT 514 (3); one approved class in values (3)
- * Public Health Requirements
 - o Core courses: ENV H 580 (3), ENV H 581 (1), ENV H 583 (1); ENV H 700 (9); either BIOST 511, BIOST 512 (4, 4) or BIOST 517, BIOST 518 (4, 4); EPI 511 (4)
 - o Degree Pathway Requirements: Students must choose one of the following pathways:
 - + Environmental Health:
 - # Core courses: ENV H 405 (3); ENV H 453 (3); ENV H 541 (3); either ENV H 543 (3) or ENV H 577 (3/4); ENV H 552 (3); ENV H 594 (1, max. 2); courses from two of the following three areas:

- * Waste management: either ENV H 445 (3) or ENV H 446 (3)
- * Air pollution: ENV H 490 (3)
- * Water and wastewater: ENV H 545 (3)
- # Representative electives: 9 credits from the approved list of classes.
- + Toxicology:
 - # Core courses: ENV H 514, ENV H 515, ENV H 516 (4, 4, 4); ENV H 552 (3); ENV H 577 (3/4); either BIOC 405, BIOC 406 (3, 3) or BIOC 440, BIOC 441, BIOC 442 (4, 4, 4); one course in industrial hygiene or occupational medicine
 - # Electives: 9 additional credits of electives from approved list. (If student took the three-quarter biochemistry sequence above, only 3 credits of electives are required.)
- + Industrial Hygiene:
 - # Core courses: ENV H 405 (3), ENV H 553 (3), ENV H 555 (3), ENV H 557 (4), ENV H 560 (4), ENV H 564 (4); either BIOST 512 (4) or BIOST 518 (4); either ENV H 552 (3) or ENV H 570 (3)
 - # Electives: Minimum 12 credits from approved list (available from adviser) of elective courses.
- o Additional electives: Sufficient number of electives to reach a total of 90 credits

Master of Public Affairs and Master of Public Health in Environmental and Occupational Health Concurrent Degree Program

Degree Requirements

90 credits, as follows:

- * Public Affairs Requirements
 - o Core courses: PB AF 510 (1); PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3)
 - o Restricted electives: ENV H 577 (3); either HSERV 585 (3), HSERV 587 (3), or HSMGMT 514 (3); one approved class in values (3)
- * Public Health Requirements
 - o Public health core courses: either EPI 511 (4) or EPI 512, EPI 513 (3, 3); either BIOST 511 (4) or BIOST 517 (4); HSERV 510 (3); HSERV 511 (3/4)
 - o Environmental and occupational health required courses: either ENV H 405 (3) or ENV H 514, ENV H 515, ENV H 516 (3, 3, 3); either ENV H 453 (3), ENV H 553 (3), or ENV H 564 (3); ENV H 570 (3); either ENV H 472 (3), ENV H 543 (3), or ENV H 577 (3/4); ENV H 580 (1 credit for three quarters); ENV H 581 (1); either ENV H 583 (1) or HSERV 522 (3/4); either ENV H 446 (3), ENV H 490 (3), ENV H 541 (3), ENV H 545 (3), or ENV H 552 (3); ENV H 599 (3); ENV H 700 (9)
- * Additional electives: Sufficient number of electives to reach a total of 90 credits

Master of Public Affairs and Master of Health Administration Concurrent Degree Program

Degree Requirements

90 credits, as follows:

The following is a sample of the M.H.A. portion of the curriculum/schedule covering nine academic quarters with one summer internship. Students should work closely with their academic advisers while progressing through the programs. The required M.H.A. course load as represented below is approximately 62 credits. This includes the M.H.A. Capstone Project credits and M.H.A. credits typically substituted by M.P.A. credits (see footnotes for additional explanation). The required M.P.A. core credit load is 22, with additional elective credits (approximately 12) and degree project credits (6) also required. The total concurrent credit load is approximately 90 with up to 12 shared credits.

Due to ongoing changes in the MHA core curriculum, the schedule of courses below is expected to evolve. If you are considering this concurrent degree or have questions, please contact the program office.

Course requirements:

- * Health administration core: ACCTG 503 (4); HSERV 511 (4), either HSERV 522 (4) or HSERV 552 (3), HSERV 551 (2), HSERV 587 (3); HSMGMT 501 (3), HSMGMT 502 (3), HSMGMT 513 (4), HSMGMT 523 (3), HSMGMT 545 (4), HSMGMT 560 (4), HSMGMT 562 (4), HSMGMT

- 571 (3) , HSMGMT 590 (2, 2, 2, 4), HSMGMT 592 (2, 2); one class in values/ethics (3)
- * Public affairs core: PB AF 510 (1); PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3)
- * Internship: Students are encouraged to work with faculty advisors to coordinate a single internship if possible or desirable.
- * Degree projects: Students are encouraged to work with faculty advisors and instructors of the M.H.A. Capstone Project (HSMGMT 545) and M.P.A. Degree Project (PB AF 605) to attempt collaboration of a single project. A total of 10 project credits are still required.
- * Additional electives: Sufficient number of electives to reach a total of 90 credits

Master of Public Affairs and Master of Science in Forest Resources Concurrent Degree Program

Degree Requirements

90 credits, as follows:

- * Mini-core: PB AF 591/CFR 591 (1 credit each year); PB AF 590/CFR 592 (3/4); PB AF 592/CFR 571 (5)
- * Opportunity to specialize: Focused on training public, private and nonprofit leaders to synthesize the worlds of science, management and policy, this program allows students to develop management and policy skills while focusing on Forest and Economic Policy, Social Systems and Natural Resources Policy or Wildlife Conservation Policy.
 - o Forest Economics and Policy:
 - + Core classes: CFR 500 (1); PB AF 510 (1); PB AF 511, PBAF 512 (3, 3); PBAF 513 (3); PBAF 522 (3); PBAF 527, PBAF 528 (3, 3); ECON 500, ECON 502 (4, 4); either CFR 504 (4) or QERM 521 (4); applied professional field (6 credits approved by graduation committee); topics seminar or independent study in forest economics (2); forest biology, ecology, hydrology or forest products (3-5 credits, 500-level)
 - + Restricted Electives: economics (3-5 credits); analysis (3-5 credits); values (PB AF 569 or approved values course, 3 credits)
 - + Electives: Electives include additional courses, skills workshops or independent study.
 - + Thesis: CFR 600/700 (6-9 credits)
 - o Social Systems and Natural Resource Policy:
 - + Core Classes: CFR 500 (1); PB AF 510 (1); PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3); PB AF 527, PB AF 528 (3, 3); CFR 501 (5) or approved 500-level resource-related natural science course (3-5 credits); CFR 573 (3) or CFR 570 (3); approved seminar on natural resources (3 credits)
 - + Restricted Electives: economics (3-5 credits); analysis (3-5 credits); values (PB AF 596 or approved values course, 3 credits)
 - + Electives: at least 12 credits must be taken from CFR courses
 - + Thesis: CFR 600/700 (6-9 credits)
 - o Wildlife Conservation Policy:
 - + Core Classes: CFR 500 (1); PB AF 510 (1); PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3); PB AF 527, PB AF 528 (3, 3); ESRM 450 (5); ESRM 458 (5); CFR 554 (1-2); CFR 521; two of the following: ESRM 424 (3), ESRM 441 (5), CFR 501 (5), CFR 528 (3), Q SCI 477 (5)
 - + Restricted Electives: economics (3-5 credits); analysis (3-5 credits); values (PB AF 596 or approved values course, 3 credits)
 - + Electives: electives include additional courses, skills workshops or independent study.
 - + Thesis: CFR 700 (9 credits)
- * Additional electives: Sufficient number of electives to reach a total of 90 credits

Master of Public Affairs and Juris Doctor Concurrent Degree Program

Degree Requirements

90 credits minimum, as follows:

- * Law requirements:
 - o First year: LAW A 501 (2-8), LAW A 502 (2-6), LAW A 503 (2-8), LAW A 504 (2-8), LAW A 507 (4), LAW A 505 (2-5), LAW A 506 (1-6, three quarters)
 - o Second and third years: Students have great flexibility in constructing their own programs of study. The only prescribed courses are LAW B 510 (2-4) and LAW E 500 (1-3). Students should be mindful to prepare for the subjects on the state bar exam that they intend to take. Students are encouraged to undertake independent work under the supervision of a faculty member.

- o Public service requirement: Students must perform 60 hours of public service legal work during the second or third year of law school. This requirement may be satisfied by successfully completing any approved Clinical Program course, a public service externship that carries at least two credits or the Street Law course.

* Public affairs requirements:

- o Core curriculum: PB AF 511, PB AF 512 (3, 3); PB AF 513 (3); PB AF 516 (3); PB AF 522 (3); PB AF 527, PB AF 528 (3, 3)
- o Restricted electives: economics (3 credits), analysis (3 credits), values (3 credits)
- o Plan of study: 15 credits generally from one or a combination of the following Gateways: International Affairs, Environmental Policy and Natural Resources Management, Urban and Regional Affairs, Education and Social Policy, Nonprofit Management
- o Internship: Students complete a graduate-level internship equivalent to three months of full-time work.
- o Degree project: Every student is expected to complete a substantial piece of independent research. While not a thesis, the degree project enables students to work closely with UW faculty members on a topic of serious interest.

Admission Requirements

The Daniel J. Evans School of Public Affairs admits students on an annual basis, for summer or autumn quarter only. The application deadline for either quarter is February 1.

The prospective student must hold a baccalaureate degree from an accredited college or university in the United States, or its equivalent from a foreign institution. The student's academic record should be a strong one, with a minimum GPA of 3.00 on the last 90 (quarter) or 60 (semester) credits of undergraduate work. Scores on the Graduate Record Examination (GRE) general test are also required for admission. GRE and TOEFL scores are required for international students only.

The primary criterion for admission to the school is the applicant's demonstrated ability to complete the graduate program while sustaining a high level of achievement. The Evans School's admissions committee considers grades and test scores, and gives considerable weight to professional experience, volunteer work, letters of recommendation and the applicant's writing skills as demonstrated in a personal essay.

Applicants for the Evening Degree Program must demonstrate seven to ten years of progressively responsible administrative experience. If prospective students have spent most of their careers in the private sector, they will need to demonstrate an active interest in, and contact with, public issues.

Concurrent degree applicants must apply through and be accepted into both respective programs.

Although the Evans School requires no specific prerequisite courses for admission, the school's core courses in economics and quantitative methods assume that entering students have been exposed to these subjects at the undergraduate level. Ideally new students will possess an academic or professional background in governmental processes, excellent writing skills and academic preparation in microeconomics and statistics. Students lacking sufficient preparation in these areas may be required to demonstrate aptitude prior to admission, or may be asked to take preparatory course work in addition to the basic M.P.A. degree requirements.

Financial Aid

Evans School Scholarships

The Evans School offers several scholarships to entering students each year from the school's endowed fellowship funds. These typically consist of \$4000-\$5000 stipends awarded primarily on the basis of academic achievement and/or excellence in public service.

The Daniel J. and Nancy Evans Fellowship honors former U.S. Senator, Washington State Governor, and current University Regent Daniel J. Evans and his wife Nancy. The fellowship supports students who aspire to excellence in public service.

The Henry M. Jackson Fellowship, given in honor of the late U.S. Senator Henry M. "Scoop" Jackson, supports students pursuing careers in environmental policy and natural resources management.

The Brewster C. Denny Fellowship, named for former Dean Brewster Denny, supports students who are committed to excellence in public service.

The Robert J. Lavoie Fellowship provides funds to outstanding students who are preparing to work in public service. Mr. Lavoie served as a Deputy Mayor of Seattle.

The Hubert G. Locke Fellowship, established in honor of former Dean Hubert Locke, provides support for students pursuing internships in nonprofit organizations devoted to social justice issues.

The William Shelton Fellowship is funded by the Scottish Rite Foundation of Washington and supports students with a demonstrated commitment to the values of public service.

The George A. Shipman Fellowship offers support to outstanding students pursuing careers in public service. Professor George Shipman was the founder of public administration education at the University of Washington.

Applicants interested in departmental scholarships must submit the Evans School Financial Aid Form with their Evans School application.

Assistantships

The Evans School offers approximately 20 to 30 research, teaching, and staff assistantship positions each year. These positions are typically 10 to 20 hours per week and may include tuition waivers. Hiring for assistantships is a competitive process. Announcements are posted as the positions become available.

Research assistantships are open to first and second year students. First year students are eligible upon their arrival at the school. Students typically work on grant-funded studies, special conferences, and public policy colloquia series sponsored by the school's research centers. Research assistants are exposed to a wide range of policy issues, including regional growth management, international trade, state and federal entitlement programs, health-and-human-services delivery and environmental protection. In addition, up to four research fellowships are offered each year to highly qualified applicants during the admissions process. These fellowships guarantee a paid research assistantship for the first year of study and tuition support.

Teaching and staff assistantships are reserved for second year students only. Teaching assistants are hired for the Evans School's core courses and computer lab. Staff assistantships include such positions as Hubert Humphrey Fellows Coordinator, Peer Advisor, Evening Degree Program Recruitment Coordinator and Internship Coordinator.

Work-Study Status

When hiring research assistants, preference is often given to students possessing work-study status. Work-study status is one of several forms of aid granted by the University of Washington Financial Aid Office based on information provided in a student's FAFSA. Financial aid applicants should highlight any financial change expected on the FAFSA.

Research Facilities

The culture of the Evans School promotes the integration of extensive applied research into the academic program. Students participate in independent research work related to their degree projects. In addition to supporting the independent research of its faculty members, the school houses the Forum at the Evans School and several research and policy centers.

The Forum at the Evans School

The Forum was established in the fall of 1998 under a three-year grant from the Henry M. Jackson Foundation. As the outreach arm of the Evans School, the Forum brings combined strength in its capacity for civic engagement and the depth and breadth of policy research at the school and throughout the University.

The Forum draws on the expertise of faculty, research staff, and students, focusing on three program areas: Leadership and the New Governance, Engaged Citizens and Engaged Communities, and Meeting the Challenges of Growth and Change.

Guests of the Forum address the process of change, the role of institutions

in influencing change, and the importance of targeting policies and programs. In each of these areas, the Forum promotes diverse, credible, and reasoned discussions between and among citizens and leaders from the public, private, and nonprofit sectors. Through partnerships with print and broadcast media organizations, the Forum seeks to expand resources for broad public discussion of critical policy issues.

Cascade Center for Public Service

The Cascade Center for Public Service is the executive education arm of the Evans School. Established in 1984, the center offers two-, three-, and five-day courses as well as two-week advanced programs for leaders and managers in the public and nonprofit sectors. Cascade courses are held in Everett, Leavenworth, Olympia, Seattle, the Tri-Cities, Vancouver, and Wenatchee, and can count as credit toward an M.P.A. degree.

Electronic Hallway

The Electronic Hallway, www.hallway.org, is an internationally recognized resource for public affairs teaching and curriculum development. It supports the Evans School teaching mission and distributes cases and skill exercises to educators in public policy and management worldwide.

Human Services Policy Center

The mission of the Human Services Policy Center (HSPC) is to foster effective, integrated services to children and families, based upon the collaborative efforts of faculty in professional schools of the University of Washington. Achieving this mission entails supporting communication among policy analysts (academic, public, and private), policymakers, practitioners, community/civic leaders, and the media. Combining interdisciplinary applied research with effective communication allows HSPC to help focus and add depth to consideration of critical policy issues in the state of Washington. The center conducts most of its applied research in partnership with organizations engaged in direct services, governance, or policy advocacy in order to achieve direct applicability of research efforts. HSPC's current areas of focus are financing early childhood care and education, communications and public policy, comprehensive community initiatives, statistical monitoring of child and family well-being, and program evaluation and outcomes-based planning.

Center on Reinventing Public Education

The Center on Reinventing Public Education seeks to develop and evaluate methods of public oversight that can allow schools to be focused, effective and accountable. The center, established in 1993, pursues a national program of research and development on proposals such as charter schools, school contracting choice and school system decentralization. It also conducts research into reform initiatives in Washington and the Seattle public schools. The center seeks to inform community leaders, policy makers, school and school system leaders, and the research community.

Northwest Policy Center

The Northwest Policy Center (NPC) is dedicated to enhancing opportunities for people in need, fostering community well-being, improving the vitality of key sectors in a changing economy, and advancing equitable budget policies. NPC conducts research on the regional economy; works with policy makers and practitioners to develop and implement innovative economic, workforce, and community development strategies; and evaluates and shares lessons learned.

Urban Health Initiative

The purpose of the Urban Health Initiative (UHI) is to work closely for a period of up to ten years with five U.S. cities-Baltimore, Detroit, Oakland, Philadelphia and Richmond-to improve the health and safety of children living in these areas. Because each city is encouraged to try innovative approaches, a major responsibility of UHI is to document and share strategies that work over time, as well as those that prove less fruitful. UHI's National Program Office is a joint program of the Evans School and the School of Public Health and Community Medicine (SPHCM). UHI's National Program Director, Charles Royer, is the former mayor of Seattle (1978-1990). Mr. Royer and Deputy Director Cynthia Curreri have taught and lectured in both the Evans School and SPHCM.

Course Descriptions

See page 603.

School of Public Health and Community Medicine

Dean

Patricia W. Wahl

F350 Health Sciences

The School of Public Health and Community Medicine (SPHCM) is composed of five departments: Biostatistics, Environmental and Occupational Health Sciences, Epidemiology, Health Services, and Pathobiology.

Undergraduate Program

A Bachelor of Science degree and an undergraduate minor are offered in the Department of Environmental and Occupational Health Sciences. The Department of Health Services offers a Bachelor of Science degree in health information administration through the UW Evening Degree Program. Students may pursue a general studies bachelor's degree with an emphasis in public health by working with faculty in SPHCM and the College of Arts and Sciences, UW General Studies Office, 171 Mary Gates Hall. The SPHCM also offers a school-wide public health minor, requirements for which are described in the Health Services section.

Graduate Program

The SPHCM offers graduate programs leading to the degrees of Master of Public Health (M.P.H.), Master of Health Administration (M.H.A.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.). Admission requirements vary by degree and field and are described in the sections of each department.

Master of Public Health Degree: The M.P.H. is a professional degree that provides broad training in public health. Each track or program provides additional training in a particular area. Graduates pursue careers in public health practice settings, academia, or research. The M.P.H. degree is offered in the departments of Biostatistics, Environmental and Occupational Health Sciences, Epidemiology, and Health Services. Students earning the M.P.H. may choose from several areas including biostatistics, community oriented public health practice, environmental and occupational health, epidemiology, health and policy research, international health (in Epidemiology or Health Services), maternal and child health (in Epidemiology or Health Services), occupational and environmental medicine, public health genetics, public health nutrition, or social and behavioral sciences. The M.P.H. degree in public health nutrition is offered through the Nutritional Sciences Interdisciplinary Graduate Program and the M.P.H. in public health genetics is a multidisciplinary program that involves faculty from throughout the University. The Extended M.P.H. Program is a three-year, part-time program that allows mid-career public health professionals to pursue the M.P.H. degree in community practice, health education, maternal and child health, or oral health while continuing their employment.

Master of Health Administration Degree: The M.H.A. degree is offered by the interdisciplinary Health Services Administration Group in the Department of Health Services under the auspices of the Graduate School. The program prepares students for careers in management, planning, and policy analysis in a variety of settings in the health care field. The purpose of the M.H.A. curriculum is to integrate the knowledge, skills, and experience that encompass health services management, planning, and policy analysis. Students develop knowledge and skills that enable them to better understand and manage change, analyze information and make decisions, and manage organizations and the people in them. The Executive M.H.A. Program is a part-time program designed for mid-career health services professionals, including physicians and other experienced clinicians, who wish to continue their employment while pursuing the M.H.A. degree. The program provides a balance of theory and practical management skills.

Master of Science and Doctor of Philosophy Degrees: The M.S. and Ph.D. programs in the departments of Biostatistics, Environmental and Occupational Health Sciences, Epidemiology, Health Services, and Pathobiology prepare students for academic or research careers. The M.S. and Ph.D. programs in the Nutritional Sciences program, and the Ph.D. program in the Institute for Public Health Genetics are administered in SPHCM, although the degrees are awarded through the Graduate School's interdisciplinary group structure.

The M.S. programs in biostatistics, environmental health, epidemiology, genetic epidemiology, health and policy research, industrial hygiene and safety, nutritional sciences, pathobiology, statistical genetics, and toxicology offer focused research training in specific disciplines. Graduates of these

programs often assume positions as senior technical staff in laboratories or other organizations and as research project coordinators, or pursue further graduate training. The M.S. program differs from the Ph.D. program in that more of the courses emphasize the concepts underlying methodological approaches rather than the ability to independently design a major research program.

The Ph.D. programs in biostatistics, environmental and occupational hygiene, epidemiology, health services, pathobiology, statistical genetics, toxicology, and the interdisciplinary Ph.D. programs in nutritional sciences and public health genetics, train future academicians as highly qualified independent investigators and teachers, and as well-trained practitioners. The doctoral programs are distinct from the M.S. programs by the addition of advanced coursework and the nature and scope of the dissertation research project.

Concurrent Degree Programs: The SPHCM has concurrent degree programs with the School of Business Administration, the Daniel J. Evans School of Public Affairs, and the School of Nursing that lead to concurrent M.H.A.-M.B.A., M.H.A.-M.P.A., and M.H.A.-M.N. degrees, respectively. The SPHCM and the schools of Business Administration and Public Affairs offer these degree programs during both day and evening times. The SPHCM has concurrent degree programs with the Henry M. Jackson School of International Studies, the School of Social Work, the School of Nursing, and the School of Public Affairs that lead to the M.P.H.-M.A.I.S., M.P.H.-M.S.W., M.P.H.-M.N., and MPH-MPA and MS-MPA degrees, respectively. The M.P.H.-M.N. concurrent degree program provides students opportunities to study the areas of community health care nursing and child nursing. The School of Medicine and SPHCM have a concurrent degree programs that lead to the M.P.H.-M.D., M.H.A.-M.D. and Ph.D.-MD degrees. In the autumn of 2003 the concurrent degree program with the School of Dentistry that leads to the M.P.H.-M.S.D. degrees was approved, and the concurrent M.P.H.-J.D. degree program with the School of Law is expected to be approved during the 2004-2005 year.

Residency Programs: The SPHCM offers a residency in occupational and environmental medicine. Physicians are also welcome to apply to any of the School's graduate programs.

Certificate and Graduate Certificate Programs: The SPHCM offers several graduate certificate programs including a joint program with the School of Medicine in Biomedical and Health Informatics. The Department of Biostatistics offers a graduate certificate program in statistical genetics; the Department of Health Services in health behavior and health promotion, health policy, international health, and maternal and child health; the Extended Degree Program in public health; and the Institute of Public Health Genetics in public health genetics. The Department of Health Services also offers certificate programs in health information administration (HIA) and medical management.

Biostatistics

Graduate Program

Graduate Program Coordinator
F664 Health Sciences, Box 357232
206-543-1044
bioadmit@u.washington.edu

The Department of Biostatistics offers Master of Science, Master of Public Health, and Doctor of Philosophy degrees in quantitative methods applied to the medical and biological sciences. Biology, medicine, and health services are undergoing major changes in their development as quantitative sciences. As technological advances find expression in new research tools, new theoretical concepts are being employed in the analysis of quantitative data. The techniques and viewpoints of mathematics and statistics, traditionally peripheral to biology and medicine, are now woven into the fabric of the life sciences, thereby providing exciting new opportunities in research and teaching.

Many universities have instituted programs relating mathematics or statistics to one particular biological field. The goal of the biostatistics graduate program is to equip students to develop and apply the quantitative techniques of mathematics, statistics, and computing appropriate to medicine, biology, and health services.

Because of the quality of the faculty and their involvement in a diversity of statistical applications, as well as the quality of the students, students receive an excellent education. Students are recruited from undergraduate programs in mathematics, statistics, and biology and are selected on the basis of outstanding quantitative ability.

Master of Public Health

Admission Requirements

Applicants to Biostatistics graduate programs are formally applying to the Graduate School of the University of Washington. Although all acceptance decisions are made within the Biostatistics Department, the Graduate School imposes certain minimum admission requirements. Applicants must therefore submit both a general application directly to the Graduate School and a specific application to the Biostatistics Department.

To be considered for admission to the Biostatistics MPH pathway, a candidate must hold a doctoral-level degree in another field (e.g., M.D., Ph.D., J.D.) or be currently working on such a doctoral degree. Candidates who have not yet been awarded a doctoral degree will not be awarded the Biostatistics-pathway M.P.H. until they are awarded their doctoral degree. All other prerequisites and required materials are the same for M.S., M.P.H., and Ph.D. applicants.

Degree Requirements

In addition to meeting the minimum Graduate School requirements, students must also obtain a minimum grade point average of 3.00 in each of the biostatistics core courses (BIOST 514, BIOST 515, BIOST 524, BIOST 536, BIOST 537), a minimum cumulative GPA of 3.00 in non-biostatistics core courses (EPI 512, EPI 513, HSERV 511, ENV H 511, P BIO 511, and HSERV 510), and earn a minimum GPA of 2.70 in each non-biostatistics core course

63 credits, as follows:

- * Biostatistics core courses: BIOST 514, BIOST 515 (8); BIOST 524 (3); BIOST 536, BIOST 537 (8); BIOST 580 (3); BIOST 590 (3); BIOST 700 (9). (Note: BIOST 514, BIOST 515, BIOST 524, BIOST 536, and BIOST 537 must be taken for a numerical grade.)
- * Non-biostatistics core courses: EPI 512, EPI 513 (8); HSERV 511 (3); HSERV 510 (3-4); ENV H 511 (3); P BIO 511 (3). All non-biostatistics core courses must be taken for a numerical grade.
- * Biostatistics elective courses: 6 credits of any approved biostatistics M.S. elective, or STAT 512 or STAT 513
- * Biostatistics M.P.H. practicum: MPH students must also complete a practicum experience for 3 credits in an organization or agency that provides planning or services relevant to public health.

Master of Science

Admission Requirements

Applicants to Biostatistics graduate programs are formally applying to the Graduate School of the University of Washington. Although all acceptance decisions are made within the Biostatistics Department, the Graduate School imposes certain minimum admission requirements. Applicants must therefore submit both a general application directly to the Graduate School and a specific application to the Biostatistics Department.

Potential M.S. students may enter the graduate program in biostatistics from an undergraduate major in mathematics, statistics, or a biological field. Students are occasionally admitted with backgrounds in other fields; however, all applicants must have 30 or more quarter credits in mathematics and statistics to include two years of calculus (to include multivariate calculus), one course in linear algebra, and one course in probability theory.

Degree Requirements

73 credits minimum, as follows:

- * Required courses: BIOST 514 (4), BIOST 515 (4), BIOST 536 (4), BIOST 537 (4), BIOST 580 (*, max. 9), STAT 512 (4), STAT 513 (4)
- * Elective credits: 12 required elective credits must be taken, with at least 6 credits of elective courses with a methodology emphasis, and 6 credits of elective with a biology or public health emphasis (list provided).
- * Biostatistical consulting: BIOST 590 (*). Students must take BIOST 598 before or during the quarter in which they take BIOST 590.
- * Master's Thesis: 18 credits of BIOST 700

- * Computer Proficiency: The department requires a basic level of computing proficiency from all graduates, but encourages them to take the opportunity to gain greater expertise with a variety of computing tools. The computing proficiency requirement is met when a student writes and documents a computer program sophisticated enough to demonstrate the necessary basic competence in programming, or completes an approved programming course. The student's faculty advisor can approve the proficiency requirement or refer the matter to an ad hoc faculty committee for approval. Approved courses include STAT/BIOST 534, STAT/BIOST 535; CSE 142; and MEDED 531.

Doctor of Philosophy

Admission Requirements

Applicants to Biostatistics graduate programs are formally applying to the Graduate School of the University of Washington. Although all acceptance decisions are made within the Biostatistics Department, the Graduate School imposes certain minimum admission requirements. Applicants must therefore submit both a general application directly to the Graduate School and a specific application to the Biostatistics Department.

Potential Ph.D. students may enter the graduate program in biostatistics from an undergraduate major in mathematics, statistics, or a biological field. Students are occasionally admitted with backgrounds in other fields; however, all applicants must have 30 or more quarter credits in mathematics and statistics to include two years of calculus (to include multivariate calculus), one course in linear algebra, and one course in probability theory.

Degree Requirements

Minimum 100 credits, as follows:

- * Required courses: BIOST 514 (4); BIOST 515 (4); BIOST 533 (3); BIOST 570 (3); BIOST 571 (3); BIOST 580 (*, max. 9); MATH 574, MATH 575, MATH 576 (3, 3, 3) or equivalent.; STAT 512, STAT 513 (4, 4); STAT 581, STAT 582, STAT 583 (3, 3, 3).
- * Students must earn a minimum 3.0 grade in each of the required courses. At the faculty's discretion, qualifying exam performance may outweigh a course grade below the minimum. (Note: The minimum grade requirement for elective courses is 2.7.)
- * Elective credits: 15 elective credits must be taken, consisting of at least 6 credits of elective courses with a methodology emphasis and 9 credits of elective with a biology or public health emphasis (list provided).
- * In addition to the above courses, students in the Ph.D. program must complete 36 credits of BIOST 800, write a dissertation, complete a consulting class, and demonstrate proficiency in a computer language.
- * If a Ph.D. student enrolls in STAT 512 and STAT 513, he or she must take the M.S. Theory Exam in the following June for advisory purposes. Ph.D. students must also take the Ph.D. Statistical Theory exam during the summer following enrollment in STAT 581, STAT 582, STAT 533 and the Ph.D. applied exam during the summer following enrollment in BIOST 571 and BIOST 572, or in BIOST 570 and BIOST 571, or if both STAT 581, STAT 582, STAT 583 and BIOST 570 and BIOST 571 are taken in the same year the student may elect to delay the Ph.D. applied exam by one year. If either exam is failed, it must be passed the following year.
- * Students in the Ph.D. program must also complete a biology project, and pass the General and Final Examinations.
- * Computer Proficiency: The department requires a basic level of computing proficiency from all graduates, but encourages them to take the opportunity to gain greater expertise with a variety of computing tools. The computing proficiency requirement is met when a student writes and documents a computer program sophisticated enough to demonstrate the necessary basic competence in programming, or completes an approved programming course. Approved courses include: STAT/BIOST 534, STAT/BIOST 535; and CSE 142.

Course Descriptions

See page 606.

Environmental and Occupational Health Sciences

F461 Health Sciences Environmental health focuses on identifying, evaluating, and controlling environmental conditions that may have an adverse impact on human health. Examples of problem areas requiring environmental health expertise are assuring adequate quality and quantity of food and drinking water, safe treatment and disposal of domestic and industrial waste materials, limiting or reducing air and noise pollution, limiting occupational exposure to hazardous substances and unsafe conditions, assuring safe and healthful housing, controlling the spread of insect- and rodent-borne illness, proper selection and use of pesticides, and understanding the effects of global changes in climate and the atmosphere on human health.

Undergraduate Program

Adviser
F461D Health Sciences, Box 357234
206-543-4207
ehug@u.washington.edu

The Department of Environmental and Occupational Health Sciences offers the following programs of study:

- * The Bachelor of Science degree with a major in environmental health
- * A minor in environmental health

Bachelor of Science

Suggested First- and Second-Year College Courses: ECON 200; POL S 202; COM 220; STAT 220 or STAT 311.

Department Admission Requirements

1. 90 credits with a minimum cumulative GPA of 2.50.
2. Completion of the following courses: 5 credits in English composition; BIOL 180, BIOL 200, BIOL 220; CHEM 142, CHEM 152, CHEM 162; CHEM 223, CHEM 224 (or CHEM 237, CHEM 238, CHEM 239); MATH 124 or MATH 144 or Q SCI 291.
3. Applications are accepted for each quarter. Application deadlines are April 15 for autumn quarter, November 15 for winter quarter, and February 15 for spring quarter. After the deadline has passed, applications are accepted on a space-available basis. Applicants are considered for admission when they are within one quarter of completing the admission requirements.
4. Additional Information: Students are encouraged to apply to the program during their sophomore year so they may begin the upper-division courses in their junior year.

Major Requirements

1. General Education and Basic Skills: Completion of 10 credits in VLPA-designated courses and 10 credits in I&S-designated courses (of which 6 credits are specified under requirement 3), plus 7 credits in W-designated courses (of which 4 credits are specified under requirement 4).
2. PHYS 114, PHYS 115, PHYS 117, PHYS 118. Completion of these courses prior to entering the program is recommended. Physics is a prerequisite for some upper-division ENV H courses.
3. ENV H 311, ENV H 405, ENV H 431, ENV H 432, ENV H 433, ENV H 472, ENV H 482, and two of the following: ENV H 440, ENV H 441, ENV H 445 (or ENV H 446), ENV H 490.
4. EPI 420, STAT 311 (or STAT 220 or Q SCI 381), T C 333, MICROM 301, MICROM 302.
5. 30 additional credits of approved electives.
6. Sufficient elective credits to reach a total of 180 credits.

Minor

Minor Requirements: 29 credits as follows:

1. Core Courses: 14 credits of the following: ENV H 311, ENV H 405, EPI 420; STAT 200 or STAT 311.
2. Approved Electives: 15 credits of electives from the approved departmental list. See Web page or adviser for details.

Student Outcomes and Opportunities

- * *Instructional and Research Facilities:* The department houses thirteen centers and institutes and twenty labs.
- * *Honors Options Available:* None offered.
- * *Research, Internships, and Service Learning:* The department operates an internship program in cooperation with government agencies and private employers throughout the state. Each student intern works under the supervision of an experienced employee, with guidance from a faculty member. Internship placements are available throughout the year for variable amounts of academic credit.
- * *Department Scholarships:* None offered.
- * *Student Organizations/Associations:* UW Student Environmental Health Association

Graduate Program

Graduate Program Coordinator
F461 Health Sciences, Box 357234
206-543-3199

The Department of Environmental & Occupational Health Sciences offers three graduate degrees: Master of Science, Master of Public Health, and Doctor of Philosophy. The areas of emphasis are environmental and occupational hygiene (Ph.D.) industrial hygiene and safety (M.S.), toxicology (Ph.D./M.S.), environmental health (M.S.), and occupational and environmental medicine or environmental and occupational health (M.P.H.).

The Ph.D. in Environmental and Occupational Hygiene option focuses on the assessment of exposures, health effects, and control strategies in community and work environments. The program emphasizes expertise in exposure assessment to evaluate human health risks from chemical, physical, and biological agents. Research opportunities include: laboratory and field investigations of environmental exposures and health outcomes; air, soil and water pollution monitoring; ambient, indoor, and personal exposure modeling; evaluation of biomechanical stress factors and organization of the work environment; development of new instruments, biomarkers, and novel methods for assessing human exposures; and evaluation of effective control strategies for the prevention or reduction of illness and injury.

The M.P.H. in Environmental and Occupational Health provides an opportunity for students to focus on the recognition, assessment, and control of environmental and occupational hazards, the impact of these hazards on health and society, and approaches to regulations, enforcement, and policy development. It emphasizes development of skills essential to science-based public health practice. In addition to coursework, students complete a field practicum and research in any of the department's research facilities or in a field setting.

The M.P.H. in Occupational and Environmental Medicine is for individuals with an earned doctorate. The goal of the program is to provide training in the public health sciences with a focus on occupational and environmental health. The program provides didactic instruction and participation in field studies. Research efforts focus on understanding, preventing, and managing environmental and occupational disease, injury, and disability. Physicians also have the option of applying for a concurrent fellowship or residency in occupational and environmental medicine.

The concurrent M.P.H./M.P.A. or M.S./M.P.A. degree programs with the Daniel J. Evans School of Public Affairs seek to educate students who will bring substantive public health knowledge and a strong policy and management orientation to their professional careers. With several courses that satisfy degree requirements in both programs, students are able to earn the two degrees in a shorter period of time than if the degrees were taken separately. Applicants must apply to both programs. Admission Requirements

Prerequisites for admission to the M.S. industrial hygiene and safety, toxicology, and environmental health programs and the M.P.H. environmental and occupational health program include a bachelor's degree in science or engineering with coursework in biology, chemistry, calculus, and physics. Applicants with non-science majors will be considered if the prerequisite courses have been completed. Competitive applicants typically have strong grades and Graduate Record Examination scores, a statement of personal goals consistent with the program, and supportive letters of reference.

Prerequisites for admission to the M.P.H. Occupational and Environmental Medicine program include a doctoral degree (M.D., D.O. or equivalent) with prior coursework in physics, chemistry, calculus, and biology. Concurrent residency applicants must satisfy additional prerequisites including graduation from a Class A medical school (U.S., Canada, or equivalent) and completion of one year of approved internship. Three years in primary care specialty is also encouraged.

Prerequisites for admission to the Ph.D. environmental and occupational hygiene and toxicology programs include a bachelor's degree in science or engineering with coursework in biology, chemistry, calculus, and physics. A master's degree in a related field is recommended for Ph.D. environmental and occupational hygiene applicants. Selection of an applicant will also be based upon an honors-level GPA, a statement of personal goals consistent with the program, supportive letters of reference, and high scores on the Graduate Record Examination.

International applicants are also required to submit official scores for the Test of English as a Foreign Language (TOEFL). TOEFL scores of 580 (237 computer) or higher are required for admission to the M.S., M.P.H., and Ph.D. programs.

Master of Public Health

Degree Requirements

63 credits, as follows:

- * Core Requirements: EPI 511 (or EPI 512, EPI 513), BOST 511 (or BOST 517), M.P.H./M.P.A. students are also required to take BOST 512 (or BOST 518), HSERV 511, and HSERV 510.
- * Required Courses: ENV H 405 (or ENV H 514, ENV H 515, and ENV H 516), ENV H 453 (or ENV H 553 or ENV H 564), ENV H 570, ENV H 577 (or ENV H 472 or ENV H 543), ENV H 446 (or ENV H 490, or ENV H 541, or ENV H 545, or ENV H 552). Courses in environmental health not chosen can be taken as electives.
- * Electives
 - o Thesis Track: At least two additional 400- or 500-level departmental courses (minimum 6 credits).
 - o Project Track: At least four additional 400- or 500-level departmental courses (minimum 9 credits).
- * Practicum: ENV H 599
- * Degree Project:
 - o Thesis Track: ENV H 700
 - o Project Track: ENV H 598

Master of Science, Environmental Health

Degree Requirements

64 credits, as follows:

- * Core Courses: ENV H 580, ENV H 581, ENV H 583, ENV H 700, BOST 511 (or BOST 517 or higher), EPI 511
- * Required Courses: ENV H 405, ENV H 453, ENV H 541, ENV H 543 (or ENV H 577), ENV H 552, ENV H 594, ENV H 445 (or ENV H 446), ENV H 490, ENV H 545
- * Representative Electives: 9 graded elective credits, approved by the student's academic adviser.

Master of Science, Industrial Hygiene

Degree Requirements

62 credits, as follows:

- * Core Courses: ENV H 580, ENV H 581, ENV H 583, ENV H 700, BOST 511 (or BOST 517, or higher), EPI 511. Higher level biostatistics and epidemiology courses can be substituted for BOST 511 or BOST 517, and for EPI 511.
- * Required Courses: ENV H 405, ENV H 553, ENV H 555, ENV H 557, ENV H 560, ENV H 564, BOST 512 (or BOST 518, or higher level), ENV H 552 (or ENV H 570). If both ENV H 552 and ENV H 570 are taken, one can be used toward the 12 elective credits (see below).
- * Electives: 12 or more credits from the list below, in consultation with the program director or adviser. If both ENV H 552 and ENV H 570 (above) are taken, one may count toward required elective credits. Courses include ENV H 417, ENV H 446, ENV H 457, ENV H 556, ENV H 559, ENV H 562, ENV H 566, ENV H 584, ENV H 596 (taken winter quarter).

Master of Science, Safety and Ergonomics

Degree Requirements

62 credits, as follows:

- * Core Courses: ENV H 580, ENV H 581, ENV H 583, ENV H 700, BOST 511 (or BOST 517, or higher), EPI 511. (Higher level biostatistics and epidemiology courses can be substituted for BOST 511 or BOST 517, and for EPI 511.)
- * Required Courses: ENV H 405, ENV H 553, ENV H 560, ENV H 562, ENV H 564, ENV H 566, ENV H 596, BOST 512 (or BOST 518). (Higher level biostatistics courses can be substituted for BOST 512 or BOST 518). IND E/ENV H 537, MGMT 300.
- * Representative Electives: ENV H 457, ENV H 512, ENV H 555, ENV H 557, ENV H 559, ENV H 569, ENV H 570, ENV H 572, ENV H 584, T C 517, UCONJ 420.

Master of Science, Toxicology

Degree Requirements

63 credits, as follows:

- * Core Courses: ENV H 580, ENV H 581, ENV H 583, ENV H 700, BOST 511 (or BOST 517, or higher), EPI 511.
- * Required Courses: ENV H 514, ENV H 515, ENV H 516, ENV H 552, ENV H 577, BIOC 405, BIOC 406 (or BIOC 440, BIOC 441, BIOC 442), ENV H course in industrial hygiene or occupational medicine).
- * Representative Electives: Toxicology students who take the two-quarter biochemistry series (BIOC 405, BIOC 406) must have an additional 9 graded elective credits. Students who choose the three-quarter biochemistry series (BIOC 440, BIOC 441, BIOC 442) must have an additional 3 graded elective credits. Electives must be approved by the student's academic adviser. Electives may include ENV H 511, ENV H 512, ENV H 531, ENV H 532, ENV H 533, ENV H 535, ENV H 550, ENV H 553, ENV H 555, ENV H 567, ENV H 570, ENV H 582, ENV H 584, ENV H 591, BIOL 403, BIOL 411, BOST 521, C MED 407, MICROM 441, MICROM 442, MICROM 518, PATH 444, PATH 555, P BIO 500-level courses, P BIO 405, P BIO 406, P BIO 507, PEDS 512, PHCOL 401, PHCOL 402, PHCOL 403, PHCOL 527.

Doctor of Philosophy, Environmental and Occupational Hygiene

Degree Requirements

90 credits minimum, as follows:

- * Core Sciences (11-12 credits): Sequence of three courses in one area, to be approved by adviser.
- * Biostatistics (3 credits): BOST 512 (or BOST518 or higher)
- * Epidemiology (4 credits): EPI 511 (or higher)
- * Environmental and Occupational Health Seminar (6 credits): ENV H 580
- * Dissertation (27 credits): ENV H 800
- * Lab Rotations (6-9 credits): ENV H 595
- * Required courses:
 - o Industrial Hygiene (6 credits): ENV H 553 and ENV H 555
 - o Toxicology (3 credits): ENV H 405 (or more advanced)
 - o Environmental Chemistry (3 credits): ENV H 552
 - o Occupational and Environmental Epidemiology (3 credits): ENV H 570
 - o Electives (20 credits): 10 elective credits are unspecified and 10 must be in courses taught by Industrial Hygiene or Environmental Health program faculty.

Doctor of Philosophy, Toxicology

Degree Requirements

90 credits minimum, as follows:

- * Core Sciences (11-12 credits): Sequence of three courses in one area, to be approved by adviser.
- * Biostatistics (3 credits): BOST 512 (or BOST518 or higher)
- * Epidemiology (4 credits): EPI 511 (or higher)
- * Environmental and Occupational Health Seminar (6 credits): ENV H 580
- * Dissertation (27 credits): ENV H 800
- * Lab Rotations (6-9 credits): ENV H 595

- * Required courses:
 - o Toxicology (9 credits): ENV H 514,515,516
 - o Toxicology Seminar (9 credits): Of the 9 credits (minimum) of current topics courses, at least six credits must be in ENV H 591. The other credits can be chosen among other current topics courses offered by the Department of Environmental Health or other departments, with approval of student's advisory committee.
 - o Advanced Toxicology: 6 credits from approved list
 - o Physiology: 3 credits from approved list
 - o Electives (20 credits): 10 elective credits are unspecified and 10 must be in courses taught by Industrial Hygiene or Environmental Health program faculty.

Financial Aid

Support is available for many students in the form of traineeships or research assistantships, which include tuition. This support comes from federal and private sources awarded to the department or School. Research Facilities

Specialized laboratories exist for research in industrial hygiene chemistry, optical remote sensing of chemicals, industrial ventilation, ergonomics, trace organics and heavy metals, environmental microbiology, electron microscopy, controlled exposure to environmental agents, and toxicology (including toxicogenomics and analytical cytology). Field research is facilitated through an extensive consultation-service program conducted by this department for labor and industry in Washington state.

Course Descriptions

See page 608.

Epidemiology

Graduate Program

Graduate Program Coordinator
F262 Health Sciences, Box 357236
206-685-1762 or 206-543-8226
epi@u.washington.edu

The Department of Epidemiology offers three graduate degrees in the field of epidemiology for individuals intending to become academicians, highly qualified research specialists, or well-trained public health practitioners.

The Master of Public Health degree requires coursework in health services and environmental health, in addition to epidemiology and biostatistics, as well as a thesis and a practicum. Three tracks are available: the General Track, which is selected by most students; the Maternal and Child Health Track (MCH); and the International Health Track (IHP). The MCH and IHP tracks require course work in the respective specialty areas in addition to the requirements of the General Track.

The following degrees are available concurrent with an M.P.H. (Epidemiology): Doctor of Medicine (M.D.), Master of Arts in International Studies, and Master of Public Affairs.

The Master of Science degree requires concentration on courses and research in epidemiology and biostatistics as preparation for a research specialization or as a prelude to the Doctor of Philosophy program.

The Ph.D. course requirements differ from the M.S. program requirements primarily in the scope and complexity of research for the dissertation. Course work includes a basic series in epidemiology and biostatistics and electives in substantive areas such as cancer, cardiovascular disease, environmental exposures, genetics, infectious diseases, injury, and nutrition, and research methods.

The Department also offers several graduate certificate programs, which are open to any qualified graduate student at the University. They offer specialization in the following specific interdisciplinary areas:

- * International Health: <http://depts.washington.edu/ihprog/admissions/cert.htm>
- * Maternal and Child Health: <http://depts.washington.edu/mchprog/certificate.htm>
- * Public Health Genetics: <http://depts.washington.edu/phgen/certificateprogram>

- * AIDS and Sexually Transmitted Diseases: http://depts.washington.edu/cfas/training/grad_cert

Master of Public Health

Admission Requirements

Admission to all graduate programs is highly competitive and is based on the following evaluation of the applicant:

- * Background in epidemiology or other health-related fields (such as medicine, health or biological sciences, or mathematics), including prior areas of study and work experience
- * Undergraduate and graduate grades
- * GRE scores (except for master's degree applicants with a prior doctorate from a U.S. university and M.D./Ph.D. applicants funded by MSTP)
- * TOEFL or IELTS score for international applicants
- * Letters of reference
- * Applicant's goal statement

Degree Requirements

Minimum 63 credits, as follows:

- * 27 course credits of which 18 must be numerically graded (1-credit courses, EPI 101, EPI 405, EPI 420, EPI 497, EPI 499, EPI 505, EPI 510, EPI 511, EPI 593, EPI 595, EPI 600, EPI 700, EPI 800, courses taken for a completed degree program of another department or university, or courses for which waivers were granted do not count as course credits).
- * A minimum of 3 credits (120 hours) in a field-based practicum (EPI 595)
- * 9 to 18 thesis (EPI 700) credits.
- * Core Courses: 21 credits, as follows: EPI 512 (4), EPI 513 (4), BOST 511 (4), HSERV 510 (3), HSERV 511 (3)
- * One of the following environmental health courses must also be taken for a grade: ENV H 511 (3), ENV H 517 (3), ENV H 577 (3/4), ENV H 584 (3)
- * Electives: 6 credits of EPI course electives (EPI 514 recommended; 1 credit courses, EPI 101, EPI 420, EPI 405, EPI 497, EPI 499, EPI 505, EPI 510, EPI 511, EPI 534, EPI 540, EPI 549, EPI 588, EPI 593, EPI 595, EPI 600, EPI 700, or EPI 800 may not be counted as electives)
- * Students may also enroll in additional elective courses in epidemiology and other relevant departments and for independent study (EPI 600) for a total of 63 credits. Relevant 400-level course work may count toward the total. Course work unrelated to health and at the 300-level or below will not count toward the total.

M.P.H. Specialized Program Options: The M.P.H. degree has specialized options in Maternal and Child Health, and International health, both of which have additional course requirements. Students enrolled in a specialized program should contact the appropriate program office.

Master of Science

Admission Requirements

Admission to all graduate programs is highly competitive and is based on the following evaluation of the applicant:

- * Background in epidemiology or other health-related fields (such as medicine, health or biological sciences, or mathematics), including prior areas of study and work experience
- * Undergraduate and graduate grades
- * GRE scores (except for master's degree applicants with a prior doctorate from a U.S. university and M.D./Ph.D. applicants funded by MSTP)
- * TOEFL or IELTS score for international applicants
- * Letters of reference
- * Applicant's goal statement

Degree Requirements

60 credits, as follows:

- * 27 course credits, of which 18 must be graded (1-credit courses, EPI 101, EPI 405, EPI 420, EPI 497, EPI 499, EPI 505, EPI 510, EPI 511, EPI 593, EPI 595, EPI 600, EPI 700, EPI 800, courses taken for a completed degree program of another department or university, or courses for which waivers were granted do not count as course credits)
- * 9 to 18 thesis credits (EPI 700)

- * Core Courses: The following core courses must be taken for a grade: EPI 512 (4), EPI 513 (4), BIOST 511 (4), BIOST 512 (4), BIOST 513 (4).
- * Electives: Two EPI courses of at least 2 credits each
- * School Electives: Two additional courses (2 or more credits each) in any department of the School of Public Health (including Epidemiology) or other University of Washington courses related to the biological, physical or social/behavioral factors which affect health.
- * Elective courses may not include EPI 101, EPI 405, EPI 420, EPI 497, EPI 499, EPI 505, EPI 510, EPI 511, EPI 593, EPI 595, EPI 600, EPI 700, EPI 800, or BIOST 502, BIOST 503. The epidemiology electives may not include EPI 534, EPI 540, EPI 549 or EPI 588 (these courses may be counted as SPHCM electives).
- * Students may also enroll in additional elective courses in epidemiology, independent study (EPI 600) and in other departments for a total of 60 credits. Relevant 400-level coursework may count toward the total. Coursework unrelated to health and at the 300-level or below will not count.

Concurrent Molecular and Cellular Biology (MCB) PhD/ Epidemiology MS Program: Information on this program is available on the Epidemiology Department website at http://depts.washington.edu/epidem/mcb_epi.htm.

Doctor of Philosophy

Admission Requirements

Admission to all graduate programs is highly competitive and is based on the following evaluation of the applicant:

- * Public health or other health-related field (such as medicine, health or biological sciences, or mathematics), including his/her prior areas of study and work experience
- * Undergraduate and graduate grades
- * GRE scores (except for MD/PhD applicants funded by MSTP)
- * TOEFL or IELTS score for international applicants
- * Letters of reference
- * The applicant's goal statement.
- * Applicants do not need to locate faculty mentors in advance in order to be admitted.

Degree Requirements

Minimum of 90 total credits, as follows:

- * 18 credits of core courses must be taken for a numerical grade: EPI 512 (4), EPI 513 (4), EPI 536 (4) EPI 537 (4), BIOST 517 (4), BIOST 518 (4)
- * Electives (minimum required): One course (minimum 2 credits) in infectious disease epidemiology (EPI 520, EPI 526, EPI 529, EPI 532, EPI 568, EPI 590 when topic is vaccines); two courses (minimum 2 credits each) in epidemiologic methods or non-infectious disease epidemiology (EPI 516, EPI 517, EPI 519, EPI 521, EPI 522, EPI 524, EPI 528, EPI 531, EPI 533, EPI 538, EPI 539, EPI 542, EPI 544, EPI 546, EPI 548, EPI 570, EPI 571, EPI 573, EPI 590 when topic is injury). Three additional courses (minimum 2 credits each) in any department of the School of Public Health and Community Medicine (including Epidemiology) or other University courses related to the biological, physical or social/behavioral factors which affect health. This requirement may not be met by EPI 101, EPI 405, EPI 420, EPI 497, EPI 499, EPI 505, EPI 510, EPI 511, EPI 593, EPI 595, EPI 600, EPI 700, EPI 800, or BIOST 502, BIOST 503. EPI 534, 540, 549, 588 and EPI 590 (when topic is laboratory methods) may count as SPHCM electives, but will not fulfill the epidemiologic methods/non-infectious disease course requirement.

Additional courses in infectious disease epidemiology, chronic disease epidemiology, as well as courses offered by other departments or schools, may be taken depending on the student's area of interest and prior academic background. After the first year, doctoral students are encouraged to continue attending Epidemiology Seminar (EPI 583), and to attend Current Literature in Epidemiology (EPI 591). Students may also enroll in additional EPI 800 or EPI 600 to reach the total credits required.

- * Three quarters of EPI 584 (1, max. 3)
- * Dissertation: 27 credits of EPI 800
- * The student's Supervisory Committee may require additional courses to ensure that the student has adequate training in the area of epidemiology that the student is pursuing.

- * Students with a prior relevant master's need only complete 60 credits of coursework.

Financial Aid

Research training stipends with partial tuition support are available on a limited basis. Opportunities for work on various research projects may provide a stipend and support for the majority of tuition.
Research Facilities

University facilities include well-equipped laboratories, an excellent library system, and access to computers. Various opportunities for field research are provided in Seattle and elsewhere in the state, including the Fred Hutchinson Cancer Research Center, Group Health Cooperative's Center for Health Studies, the Harborview Injury Prevention and Research Center, Public Health: Seattle-King County, and several other local health institutions.

Course Descriptions

See page 611.

Health Services

H668 Health Sciences

Health information management professionals serve the healthcare industry and the public by managing, analyzing, and utilizing data vital for patient care. From paper and electronic health records to health informatics, maintaining access, quality, and privacy of patients' test results, diagnoses, prescriptions, and treatments is core to this discipline. Information management standards and policies also assure data is accessible for accurate patient billing and reimbursement, optimal health services utilization, public health reporting, and research.

Undergraduate Program

Adviser
1107 NE 45th Street, Suite 355, Box 354800
206-543-8810
hsinfo@u.washington.edu

The program in Health Information Administration offers both a postbaccalaureate certificate and a Bachelor of Science degree (Evening Degree Program).

Health Information Administration Postbaccalaureate Certificate

The program is accredited by the Commission on Accreditation for Health Informatics and Information Management Education, in cooperation with the American Health Information Management Association (AHIMA).

Special Requirements

Applicants for the certificate need a baccalaureate degree from an accredited college or university with a minimum GPA of 2.50. They must also have taken courses in, or have the requisite knowledge and skills pertaining to, the following: human anatomy and physiology (laboratory course); patho-physiology; introduction to basic computer applications such as spreadsheets, data bases, or word processing, or introductory programming; principles of management; statistics (any discipline); and medical terminology.

For more information, please visit the Health Information Administration Web page

Bachelor of Science

Health Information Administration Major

Suggested First- and Second-Year College Courses: Human anatomy and physiology (laboratory course); patho-physiology; introduction to basic computer applications such as spreadsheets, data bases, or word processing, or introductory programming; principles of management; statistics (any discipline); English composition; and medical terminology.

Department Admission Requirements

1. Admission to UW Day or Evening Degree Program for autumn quarter of planned entry to Health Information Administration (HIA)
2. Minimum 90 transferable credits.
3. Completion of the following prerequisites (With the exception of medical terminology, prerequisite courses may be taken at the UW or elsewhere):
 - a. Statistics (one of the following): STAT 220, STAT 311, QMETH 201, PSYCH 315, EDPSY 490, or equivalent. (4-5 credits)
 - b. Anatomy and physiology with laboratory: BIOL 118 and BIOL 119, or equivalent (6 credits)
 - c. Management: MGMT 300, or equivalent (4 credits)
 - d. Computer applications and information technology: CSE 100, INFO 100, or equivalent (5 credits)
 - e. Medical terminology: Not offered at UW. Available at various community colleges (3-5 credits)
4. Grades: Minimum cumulative GPA of 2.50. Minimum cumulative GPA of 2.50 in prerequisite coursework. Minimum 2.0 grade in each prerequisite course.
5. Prerequisites must be completed prior to admission, with the following exceptions:
 - a. Students with prerequisites in progress are considered for conditional admission. Offer will be withdrawn if prerequisites are not completed prior to beginning of program or if prerequisites are not met. Conditional admission cases are reviewed before registration for fall quarter.
 - b. Students who cannot complete prerequisites prior to admission may petition to complete them later. If the petition is granted and the student fails to complete the necessary courses in the time specified, the student will be transferred out of HIA into premajor status. Students transferred to premajor may reapply to HIA when all prerequisites are completed.
6. Admission is once a year, for autumn quarter. Admission is also competitive. Completion of admission requirements guarantees consideration but not acceptance.

Program Requirements

1. General Education Requirements
 - a. English Composition and Additional Writing (15 credits): English composition (5 credits); additional writing (W courses) (10 credits)
 - b. Quantitative & Symbolic Reasoning (4-5 credits): Depending on course taken, may be satisfied by the statistics prerequisite requirement.
 - c. Areas of Knowledge (60 credits): Minimum 20 credits each in Visual, Literary, & Performing Arts (VLP), Individuals & Societies (I&S), and Natural World (NW). (BIOL 118 and BIOL 119 may count toward both the prerequisite and NW requirements.)
2. Program Requirements (57 credits)
 - a. Disease concepts (4 credits): HIA 409
 - b. Information systems (16 credits): HIA 410, HIA 420, HIA 421
 - c. Coding and vocabulary (5 credits): HIA 412
 - d. Management (24 credits): HIA 450, HIA 454, HIA 455, HIA 456, HIA 470, HIA 480
 - e. Internships and projects (8 credits): HIA 460, HIA 462, HIA 499
3. Additional electives to complete minimum of 180 credits required for a degree.

General Studies Major

The general studies major allows undergraduate students to create an interdisciplinary, individually designed program of study in public health. The student identifies public health as a central organizing theme and designs the course of study under the guidance and supervision of at least two faculty members and a general studies adviser. The general studies major usually requires 50-70 credits, many of which come from the courses required for the public health minor. A complete description of the general studies major can be found in the Arts and Sciences section of this catalog.

Minor

The public health minor includes the study of historical and contemporary issues in public health including social and behavioral determinants of health, the geography of health and illness, the etiology of infectious and chronic diseases, the relationship between environmental factors and health, and access to health care and modes of delivery of health services.

Minor Requirements: 30 credits, including 20 credits of required courses and 10 credits of electives. Required courses include: BOST 111 (1); ENVH 311 (3); EPI 420 (3); GEOG 280 (5); HSERV 480A (3); MHE 417 (3);

PABIO 201 (2). Electives may be taken from the following courses or an approved substitute: ANTH 375 (3); ANTH 475 (5); ANTH 476 (5); ANTH 477 (3); GEOG 380 (4); HSERV 480B (1-3, max. 6); HSERV 480C (1-3, max. 6); MHE 474/PHIL 411 (5); MHE 481 (3); NUTR 300 (3); PSYCH 451 (5); SOC 212 (5); SOC 331 (5); STAT 311 (5); UCONJ 490 (3); UCONJ 497 (3).

Program contact is Jeremy Sappington at jerem@u.washington.edu. Phone: 206-616-2941.

Student Outcomes and Opportunities

* *Learning Objectives and Expected Outcomes:* The bachelor's degree program is designed to prepare individuals for careers in the management and use of health care information, and prepares students for the Registered Health Information Administrator (R.H.I.A.) national certifying examination of the American Health Information Management Association. The program gives students the tools to work in a wide variety of health care positions upon graduation, including health information management, health informatics with emphasis on electronic health records, health care quality improvement, decision support analysis, research, health insurance, and consulting. Graduates pass a national credential examination, with a majority working within the health information management field.

* *Instructional and Research Facilities:* None.

* *Honors Options Available:* None.

* *Research, Internships, and Service Learning:* Students complete two internships, one of which is the capstone project.

* *Department Scholarships:* None.

* *Student Organizations/Associations:* Students are invited to join the health information management professional association at reduced rates.

Graduate Program

Graduate Program Coordinator
H660 Health Sciences, Box 357660
206-616-2926
hsinfo@u.washington.edu

The Department of Health Services offers a two-year graduate program in health services leading to the Master of Public Health or Master of Science degree. The M.P.H. degree prepares future health practitioners, managers, and researchers to conduct the unfinished work of improving the well-being of communities in the United States and throughout the world. Graduates take jobs in health system management, health program design and evaluation, health promotion, public health practice, and policy analysis. Beginning autumn 2002, the department will offer an M.P.H. in community-oriented public health practice. This new degree program will use problem-based learning methods, and will integrate classroom instruction and experiential fieldwork to prepare students to work in community and public health practice settings. Students may also pursue any of the M.P.H. specialty options. The department also offers a three-year extended degree program in community-health management, leading to the M.P.H. degree for employed professionals working full-time.

The department also maintains primary responsibility for the graduate program in Health Services Administration (an interdisciplinary degree-granting program of the Graduate School described in the Interdisciplinary Graduate Degree Programs section of this catalog). In addition, an executive version of the traditional M.H.A. degree, designed for mid-career health care professionals, was established in winter 1998. The M.H.A. degree provides full academic preparation for careers in management and policy positions in health systems, hospitals, medical groups, health plans and other types of health care organizations.

The department offers a Ph.D. in health services and participates in the training of doctoral students from other departments on campus by offering a specialization in health services under the Doctoral Studies Program.

Master of Public Health

Admission Requirements

- * One set of official transcripts from all institutions of higher learning attended
- * Official scores from the general Graduate Record Examination (GRE) (required for applicants who have not already earned a doctoral-level degree (e.g. MD, PhD, JD) from a U.S. institution of higher learning)
- * Test of English as a Foreign Language (TOEFL) scores. For departmental purposes, a score of 580 or higher is usually required to be competitive. Applicants admitted to the program who score between 500 and 580 are required to take prescribed English classes.
- * Departmental admissions application
- * Applicant's statement, including a description of the applicant's professional background, career goals, and the educational objectives which the applicant expects to meet while completing the program
- * Three recent letters of recommendation, preferably from former supervisors and teachers.
- * An in-person or telephone interview with a Health and Policy Research faculty person is highly recommended, but not required

Degree Requirements, Health Policy and Research Option

63 credits, as follows:

- * At least 30 credits be from graduate-level courses
- * At least 18 credits from graduate-level Health Services courses
- * Coursework:
 - o Either BOST 511 (4) or BOST 517 (4)
 - o One of the following: ENV H 511 (1-3, max. 3), ENV H 517 (3), ENV H 570 (3), ENV H 577 (3-4), or ENV H 584 (3)
 - o Either EPI 511 (3-4) or EPI 512/EPI 513 (4/4)
 - o HSERV 511 (3-4) or HSERV 531 (4) (for international health students only)
 - o HSMGMT 560 (1-4, max. 4), HSERV 510 (3)
 - o HSERV 592 (1-6, max. 6) for each quarter in residence
 - o 3 credits of practicum: HSERV 595 (1-12, max. 12)
 - o 9 credits of thesis: HSERV 700
 - o Remaining credits as electives

Degree Requirements, International Health Option

The program is an elective track within the MPH degree programs in both the Departments of Health Services and Epidemiology. Students are required to complete core MPH courses, departmental requirements, a public health practicum, 12 credits of international health coursework, and a thesis on a topic relating to health in Developing Countries. The program usually requires six academic quarters to complete.

Degree Requirements, Maternal and Child Health Option

69 credits, as follows:

- * HSERV 510 (3), HSERV 511 (3/4), HSERV 541 (3), HSERV 542 (3/4), HSERV 543 (3)
- * Either HSERV 527 (4), HSERV 581 (4), or EPI 514 (4)
- * HSMGMT 560 (1-4, max. 4)
- * One of the following environmental health classes: ENV H 511 (1-3, max. 3), ENV H 517 (3), ENV H 570 (3), ENV H 577 (3/4), or ENV H 584 (3)
- * One of the following epidemiology courses: EPI 511 (3/4), EPI 512 (4), or EPI 513 (4)
- * Either BOST 511 (4) or BOST 517 (4); either BOST 512 (4) or BOST 518 (4)
- * HSERV 592 (1 credit for each of six quarters)
- * Practicum: HSERV 595 (1-12, max. 12)
- * Thesis: HSERV 700

Degree Requirements, Social and Behavioral Sciences Option

63 credits, as follows:

- * The MPH in Health Services SBS track requires the following specific courses:
 - o HSERV 511 (4), HSMGMT 560 (1-4, max. 4), BOST 511 (4)
 - o One of the following: ENV H 511 (1-3, max. 3), ENV H 517 (3), ENV H 570 (3), ENV H 577 (3/4), or ENV H 584 (3)
 - o One of the following: EPI 511 (3/4), EPI 512/EPI 513 (4, 4) (recommended)
 - o HSERV 510 (3)

- o HSERV 592 (1-6, max. 6; six quarters total required)
- o BOST 512 (4) (may be replaced with BOST 517 by advanced students with the permission of their adviser)
- o Qualitative methods course: All SBS students are required to take one Qualitative Methods course. HSERV 526 or HSERV 590 when the topic is qualitative methods
- o One of the following: HSERV 507 (3), HSERV 513 (3), HSERV 580 (3), HSERV 581 (4), HSERV 582 (3/4), HSERV 586 (3), HSERV 588 (3), or HSMGMT 514 (3/4)
- * At least 18 credit hours in 500-level Health Services classroom courses. HSERV and HSMGMT courses listed above count toward this requirement, but independent study does not. SBS Seminar does count towards this requirement.
- * At least 30 credits in graduate-level classroom courses in the School of Public Health and Community Medicine, or in other schools at the University if approved by the student's advisor.
- * At least 3 credits of HSERV 595, practicum
- * 9 credits of HSERV 700, master's thesis

Master of Health Administration

Admission Requirements

- * A baccalaureate degree from an accredited university
- * Minimum GPA of 3.00 in the last 90 graded credits
- * GRE scores

Degree Requirements

77 credits, as follows:

- * Year One Required Courses: ACCTG 503 (4); HSERV 511 (4); either HSERV 587 (3) or HSMGMT 514 (4), HSMGMT 501 (3); HSMGMT 513 (4); HSMGMT 523 (3); HSMGMT 560 (3); HSMGMT 571 (4); 12 credits of HSMGMT 590 (1-6, max. 12); 4 credits of HSMGMT 592 (2, 2)
- * Year Two Required Courses: HSERV 523 (3), HSERV 551 (2), HSERV 552 (3), HSMGMT 500 (3), HSMGMT 502 (3), HSMGMT 545 (4), HSMGMT 562 (4), HSMGMT 590 (2), HSMGMT 590 (4), MHE 523 (3), electives (2-4 credits)

Master of Science, Health Policy and Research

Admission Requirements

- * One set of official transcripts from all institutions of higher learning attended
- * Official scores from the general Graduate Record Examination (GRE) (required for applicants who have not already earned a doctoral-level degree (e.g. MD, PhD, JD) from a U.S. institution of higher learning)
- * Test of English as a Foreign Language (TOEFL) scores. For departmental purposes, a score of 580 or higher is usually required to be competitive. Applicants admitted to the program who score between 500 and 580 are required to take prescribed English classes.
- * Departmental admissions application
- * Applicant's statement, including a description of the applicant's professional background, career goals, and the educational objectives which the applicant expects to meet while completing the program
- * Three recent letters of recommendation, preferably from former supervisors and teachers.
- * An in-person or telephone interview with a Health and Policy Research faculty person is highly recommended, but not required

Degree Requirements

63 credits, as follows:

- * Either HSERV 511 (3/4) or HSERV 512 (3)
- * Either HSERV 587 (3), HSMGMT 513 (4), or HSMGMT 514 (3)
- * EPI 512 (4), EPI 513 (4)
- * Either BOST 511, BOST 512, BOST 513 (4, 4, 4), or BOST 517, BOST 518 (4, 4)
- * Two of the following: HSERV 522 (4), HSERV 523 (4), HSERV 524 (4), HSERV 525 (4), HSERV 526 (4), HSERV 527 (4), HSERV 539 (3/4), HSERV 583 (3), HSERV 584 (3), or HSERV 586 (3)
- * Three quarters of HSERV 592 (1-6, max. 6)
- * 9 credits of HSERV 700

Doctor of Philosophy

Admission Requirements

Admission priority is given to applicants who have graduated from a master program with high academic standing. Students with only a bachelor's degree with health services research experience are occasionally admitted. Generally these students are admitted to the Master of Science Program and then to the Doctoral Program.

Applicants who have a bachelor, master, or professional degree in a field related to health services are given preference over applicants who do not have such experience.

Applicants with research experience and publications are typically rated more highly.

Students admitted to the program generally have GRE scores in or above the 80th percentile.

International applicants must submit the results of the Test of English as a Foreign Language (TOEFL), unless they are a citizen of Australia, Canada, Ireland, New Zealand or the United Kingdom OR have earned a bachelor's or higher degree from the U.S. or one of the countries listed above. A minimum score of 580 (paper based) or 237 (computer based) on the TOEFL is required to be considered for admission to the UW.

Degree Requirements

100 credits minimum, as follows:

- * Required core competencies (35 credits): HSERV 512 (3), HSERV 513 (3), HSERV 514 (3); one of the following: HSMGMT 514 (3), HSERV 587 (3), or ECON 500 (3); HSERV 522 (3); BIOST 517 (4), BIOST 518 (4) (or BIOST 511, BIOST 512, BIOST 513 (4, 4, 4) or BIOST 514, BIOST 515 (4, 4)); EPI 512 (4), EPI 513 (4)
- * Area of emphasis: Five courses or 15 credits in an area of emphasis. Suggested areas of emphasis are as follows:
 - o Economics or Finance
 - o Health Behavior and Health Promotion
 - o Occupational Health
 - o Cancer Prevention and Control
 - o Evaluation Sciences
 - o Population Health and Social Determinants
 - o Global Health
 - o Maternal and Child Health
 - o Customized area of emphasis: The specific courses to be taken are selected by the student and the adviser based on the student's past coursework, experience, proposed dissertation topic, and future career goals.
- * Doctoral courses in advanced theory and methods in health services (50 credits including a minimum of 30 dissertation credits)
- * Written preliminary examination
- * Written and oral general examinations
- * Dissertation
- * Dissertation defense (final examination)

Financial Aid

Every attempt is made to ensure that students admitted are not prevented from pursuing graduate studies due to inadequate finances. Some fellowships, assistantships, scholarships, and loans are available each year. However, students should be prepared to use their own resources to finance their graduate education.

Research Facilities

In addition to using University facilities, the program has extensive links with community health-care delivery systems and agencies for research and training.

Extended M.P.H.

Graduate Program Coordinator
H685 Health Sciences, Box 357660
206-685-7580

The Extended M.P.H. Degree Program is a part-time, partial distance learning program delivered through a combination of intensive four-week

summer sessions on the University campus, directed independent study, and four intensive weekend seminars during the academic year. The program is designed for mid-career public and community health professionals with three or more years of experience related to public health. The program provides knowledge and skills required at mid- and upper-level practice and management positions for health professionals. In addition to the core courses in health services, epidemiology, biostatistics, and environmental health, the prescribed course work includes a broad exposure to the health-care system plus specific management training in budgets, finance, personnel management, economics, organization theory, and program planning and evaluation. Pathways are available in health education, maternal and child health, public health practice, and oral health.

The Extended M.P.H. Degree Program provides training in developing skills in the scientific base of public health, analytic methods, management and communication, and policy and advocacy, as well as training in cross-cutting issues. Graduates apply their skills directly to their careers.

Admission Requirements

- * Current employment in a public health related agency preferred
- * Minimum of three years experience in community, public, or environmental health-related field
- * Baccalaureate degree from an accredited college or university
- * Minimum 3.00 GPA in the last graded 90 quarter/60 semester hours
- * Graduate Record Examination (GRE) scores, taken within 6 years. (Applicants with M.D., D.O., or Ph.D. degrees from an accredited U.S. college or university may waive the GRE requirement.)

Degree Requirements

63 credits minimum, as follows:

- * Year 1 Required Courses: BIOST 502 (4), EPI 511 (3/4), HSERV 501 (3), HSERV 516 (4), HSERV 520 (1-3, max. 3), HSMGMT 560 (1-4, max. 4)
- * Year 2 Required Courses: BIOST 503 (4), ENV H 511 (1-3, max. 3), HSERV 504 (1-3, max. 3), HSERV 522 (1-4, max. 4), HSMGMT 514 (3/4), HSMGMT 563 (3)
- * Year 3 Required Courses: HSMGMT 566 (3), HSMGMT 572 (3)
- * Thesis or Project Option: HSERV 700 (master's thesis) or HSERV 598 (project); EPI 600/ENV H 600
- * Practicum (required): focus based on pathway choice
- * Elective or Pathway Credits (required): pathway courses may be spread out over two years. Electives may be taken at any time.

Course Descriptions

See page 614.

Pathobiology

Graduate Program

Graduate Program Coordinator
F161F Health Sciences, Box 357238
206-543-4338
pathobio@u.washington.edu

The Pathobiology graduate program offers graduate training in the application of basic biomedical research to diseases of public health interest. The program of study involves core courses to develop a fundamental understanding of basic cellular and molecular processes and techniques important in the application of basic biomedical research to diseases; laboratory experience to learn how to collect, analyze, interpret, and use data for solving problems; and opportunities to develop skills in communicating research findings through oral and written presentations.

Master of Science

The master's program is designed for students to develop an understanding of the applications of molecular biology to public health, epidemiology, and cellular or antigenic analysis, and microbiology or immunology. The focus in this two-year program is developing basic research skills and understanding the scientific method. Students are expected to fulfill their course requirements during the first year. Under the guidance of a faculty research mentor, students propose and complete a thesis that includes an original research project.

Admission Requirements

- * Personal Statement: The personal statement is a series of six short-answer questions. This statement plays an important role in admissions by providing the reviewers with a representation of your background and readiness for graduate studies in pathobiology.
- * One official set of transcripts from all collegiate institutions attended.
- * Three letters of recommendation.
- * Curriculum vitae
- * Official Graduate Record Examination (GRE) scores
- * International applicants are ALSO required to submit official Test of English as a Foreign Language (TOEFL) Scores. The Department of Pathobiology will not admit international applicants that have less than a TOEFL score of 600 on the paper-based test or 250 on the computerized test. The department must receive an official score report from the Educational Testing Service. TOEFL scores cannot be more than two years old.

Degree Requirements

A minimum of 60 credits as follows:

- * 21.5 credits of required courses: PABIO 550 (3), PABIO 551 (4), PABIO 552 (4), PABIO 553 (2), EPI 511 (4), PABIO 580 (1), PABIO 581 (1), PABIO 582 (1.5), PABIO 590 (1)
- * Research Credits: Sufficient credits of PABIO 600 and PABIO 700 to complete a research project.
- * Electives: Additional courses in Pathobiology or the biomedical sciences may be taken to fulfill the graded course requirement, to encompass the interests of the student, or to fulfill any additional requirements set forth by the student's committee.
- * M.S. Thesis Research Proposal: The M.S. thesis research proposal should be done by the end of the fourth quarter of the first year. The proposal should contain the following, in this order:
 - o A brief synopsis of background relevant to the project.
 - o A summary of preliminary experiments.
 - o A description of experiments planned for the next year.
- * M.S. Thesis: The thesis must be provided to the M.S. advisory committee two weeks prior to the oral presentation. Corrections should be made following their review before submission of the document to the Graduate School.
- * M.S. Oral Presentation and Defense: All students are required to give a formal seminar prior to the completion of Master's program.

Doctor of Philosophy

The doctoral program lasts four to five years and is designed for students to become capable of conducting independent research leading to the expansion of knowledge by developing skills to approach unfamiliar experimental systems and identify and explore important questions concerning pathogenesis and infection. Students develop familiarity with the paradigms for control, prevention, and treatment; develop an understanding of epidemiology and disease processes; learn basic methodologies used in this research including relevant areas of molecular biology, bacteriology, cell biology, virology, epidemiology, and biostatistics; and develop familiarity with the major classes of pathogens.

Admission Requirements

- * Personal Statement: The personal statement is a series of six short-answer questions. This statement plays an important role in admissions by providing the reviewers with a representation of your background and readiness for graduate studies in pathobiology.
- * One official set of transcripts from all collegiate institutions attended.
- * Three letters of recommendation.
- * Curriculum vitae
- * Official Graduate Record Examination (GRE) scores
- * International applicants are ALSO required to submit official Test of English as a Foreign Language (TOEFL) Scores. The Department of Pathobiology will not admit international applicants that have less than a TOEFL score of 600 on the paper-based test or 250 on the computerized test. The department must receive an official score report from the Educational Testing Service. TOEFL scores cannot be more than two years old.

Degree Requirements

90 credits minimum, as follows:

- * Required Courses: PABIO 550 (3), PABIO 551 (4), PABIO 552 (4), PABIO 553 (2), EPI 511 (4), PABIO 580 (1), PABIO 581 (1), PABIO 582 (1.5), PABIO 590 (1), PABIO 598 (2), PABIO 500 (variable), PABIO 600 (variable), PABIO 800 (27); either IMMUN 441 (4) or IMMUN 532 (3).
- * Students are required to attend Seminar (PABIO 580) and Journal Club (PABIO 581) every quarter of the academic year while enrolled. Students may be excused for up to two quarters while writing the dissertation. Students will give research presentations in the Graduate Research Symposium annually after the first year. 3 credits each of Seminar and Journal Club may each be counted towards the degree.
- * Electives: The following are recommended tracks for elective credits:
 - o Eukaryotic Pathogens: PABIO 536, PABIO 548, CONJ 531 through CONJ 544, EPI 532, MICROM 444
 - o Bacterial Pathogens: PABIO 540, PABIO 568, EPI 520, EPI 529, MICROM 552, MICROM 555. (Students without a background in bacteriology are required to take MICROM 442 or an equivalent course as a prerequisite for entry into the Bacterial Pathogens track.)
 - o Viral Pathogens: Two or more of the following are strongly recommended: CONJ 531-544, EPI 520, EPI 524, EPI 530, IMMUN 532, MICROM 540

Research Facilities

Research facilities are geographically dispersed and located in the Health Science Center of the School of Medicine, Fred Hutchinson Cancer Research Center, and Seattle Biomedical Research Institute. External support includes computer facilities and the Health Sciences Library with access to more than 345,000 volumes, 4,000 periodicals, and online bibliographic services for all national libraries of medicine and most commercial databases.

The Fred Hutchinson Cancer Research Center is a world-renowned research institution. Its mission for more than 20 years has been to eliminate cancer. Shared facilities are available, including electron microscopy, flow cytometry, tissue culture, image analysis, biotechnology center for DNA and protein synthesis and sequencing, animal facilities, biological production facility focused on monoclonal antibody production, extensive libraries, and a biocomputing center.

The Seattle Biomedical Research Institute is an independent nonprofit organization studying causes and interventions to infectious diseases of worldwide impact, including targeted research producing leading edge findings and applied research creating diagnostic tests and treatments.

Financial Aid

The department offers a twelve-month competitive salary, as well as paying tuition and health insurance, which includes medical, dental, and vision benefits. Students with satisfactory academic progress can anticipate funding for the duration of their studies.

Course Descriptions

See page 619.

Public Health Genetics

F363 Health Sciences Building

Public health genetics is an emerging field that applies advances in human genetics, genomics, and molecular biotechnology to improve public health and prevent disease.

Founded in 1997, the University of Washington's Institute for Public Health Genetics (IPHG) is a leader in the emerging field of public health genetics. Alone among U.S. universities, the U.W., through IPHG, offers graduate degrees at both the master's and Ph.D. levels.

The mission of the institute is to provide broad, interdisciplinary training for future public health professionals, to facilitate research in public health genetics, and to serve as a resource for continuing professional education.

Graduate Program

Graduate Program Coordinator
F363 Health Sciences Building, Box 357236
206-616-9286
phgen@u.washington.edu

Master of Science, Genetic Epidemiology

Admission Requirements

- * Completed program application form.
- * Statement of purpose
- * Official sealed transcripts, including courses, grades, and degrees from all institutions attended after secondary school.
- * Official Graduate Record Examination (GRE) scores. Required for all applicants, except those who hold a U.S. doctorate (neither the MCAT nor ECFMG are acceptable substitutes for the GRE.).
- * International applicants: Copy of TOEFL scores
- * Three letters of recommendation from professors, supervisors, or others who know the student's work reasonably well
- * Printed copy of completed Graduate School web application, sent along with the Public Health Genetics program application
- * Recent copy of the student's resume or curriculum vitae

Degree Requirements

68 credits minimum, as follows:

- * Required Courses: PHG 511/EPI 517 (3), PHG 518/EPI 518 (2/4), PHG 519/BIOST 516/EPI 516 (3), EPI 573/ENV H 573 (3), PHG 512/LAW E 562/MHE 514 (3); EPI 512 (4), EPI 513 (4); either BIOST 511, BIOST 512, BIOST 513 (4, 4, 4), or BIOST 517, BIOST 518 (4, 4); MEDED 536/PABIO 536 (3), GENOME 552 (1.5), GENOME 553 (1.5)
- * Elective Courses: At least two courses, other than independent study and thesis credits. Courses must be in epidemiology, biostatistics, genetics, public health genetics, or be related to the biological, physical, or social/behavioral factors which affect health, in particular ethical, legal and social issues related to genetic epidemiology.
- * Thesis: PHG 700 (9 credits minimum)

Master of Public Health, Public Health Genetics

Admission Requirements

- * Completed appropriate program application form.
- * Statement of purpose.
- * Official sealed transcripts, including courses, grades and degrees from all institutions attended after secondary school.
- * Official Graduate Record Examination (GRE) scores. Required for all applicants, except those who hold a U.S. doctorate (neither the MCAT nor ECFMG are acceptable substitutes for the GRE.).
- * International applicants: Copy of TOEFL scores.
- * Three letters of recommendation from professors, supervisors, or others who know the applicant's work reasonably well.
- * A printed copy of the applicant's completed Graduate School web application.
- * A recent copy of the applicant's resume or curriculum vitae.

Degree Requirements

63 credits, as follows:

- * Required Courses: 52 credits as follows: EPI 511 (3/4), BIOST 511 (4), HSERV 511 (3/4), ENV H 511 (1-3), HSERV 510 (3); PHG 511 (3), PHG 512 (3), PHG 513 (3), PHG 521 (3), PHG 522 (2), PHG 523 (2), PHG 581 (1); PHG 580 (3); PHG 595 (3); at least 9 credits of PHG 700
- * Electives: Remaining 11 credits may combine approved elective courses, PHG 600 credits, and PHG 700 credits.

Doctor of Philosophy

Admission Requirements

- * Completed appropriate program application form.
- * Statement of purpose.
- * Official sealed transcripts, including courses, grades and degrees from all institutions attended after secondary school.
- * Official Graduate Record Examination (GRE) scores. Required for all applicants, except those who hold a U.S. doctorate (neither the MCAT nor ECFMG are acceptable substitutes for the GRE.).
- * International applicants: Copy of TOEFL scores.
- * Three letters of recommendation from professors, supervisors, or others who know the applicant's work reasonably well.
- * A printed copy of the applicant's completed Graduate School web application.
- * A recent copy of the applicant's resume or curriculum vitae.

Degree Requirements

90 credits minimum, as follows:

- * For students who require additional training in written communication for a multidisciplinary audience, TC 509 may be required.
- * Human Genetics: Required -- GENOME 565 (4); Highly recommended -- GENOME 552 (1.5), PABIO 536 (3)
- * Public Health: Required -- EPI 511 (3/4); BIOST 511 (4) or BIOST 517 (4); ENV H 511 (1-3); HSERV 511 (3-4)
- * Core Knowledge Areas
 - o Genomics in Public Health: PHG 511 (3), PHG 513 (3), PHG 542 (3), PHG 580 (1)
 - o Implications of Genetics for Society: PHG 521 (3), PHG 522 (2), PHG 523 (2), PHG 541 (3), PHG 543 (3)
- * PHG 580 is required each quarter for all Ph.D. students till they pass the preliminary examination.
- * Preliminary Examination: Following completion of two years of study.
- * Selective Courses for Core Knowledge Areas and Development of Dissertation Topic:
 - o All students: PHG 518 (2-4), PHG 519 (3), EPI 573 (3)
 - o Genomics in public health: EPI 512 (4), EPI 513 (4), ENV H 514 (3), ENV H 515 (3), ENV H 516 (3), ENV H 567 (2), ENV H 577 (3/4), MEDCH 527 (4), PCEUT 502 (4)
 - o Implications of genetics for society: PHG 537 (2), PHG 590 (1-6), MHE 402 (5), MHE 474 (5), LAW A 596 (1-4), HSERV 551 (2), HSERV 510 (3), ANTH 475 (5), HSERV 552 (3), HSERV 583 (3), HSERV 584 (3), HSERV 587 (3)

Course Descriptors

See page 613.

Reserve Officer Training Corps Programs

Aerospace Studies

204 Clark

The Air Force Reserve Officer Training Corps program (AFROTC) is designed to motivate, educate, and commission highly qualified students for active duty as officers in the U.S. Air Force. The curriculum provides the opportunity for students in any major to gain military knowledge and to become effective Air Force officers and leaders in the aerospace environment.

Adviser
204 Clark, Box 353830
206-543-2360
afrotc@u.washington.edu

General Program Requirements

All aerospace studies courses are open to all University students. Additionally, any student may join the AFROTC program as a cadet and enroll in the 100- and 200-level general military courses. Entry into the professional officer courses (300- and 400-level courses) as a cadet seeking a commission in the Air Force is on a controlled, selective basis.

Commissioning Requirements

Students who successfully complete the AFROTC program and receive an academic degree from the University are offered commissions as second lieutenants in the Air Force.

General Military Courses

The 100- and 200-level courses for AFROTC cadets consist of one classroom hour, one-and-a-half hours of leadership laboratory, and two hours of physical fitness per week during the freshman and sophomore years. Uniforms and textbooks are provided. Students may enter the freshman class at the start of autumn, winter, or spring quarter. Sophomore students may enter at the start of autumn or winter quarter and take the freshman- and sophomore-level courses concurrently. A four-week field-training course, taken during the summer between the sophomore and junior years, is required for entry into the professional officer courses. Students receive pay and travel costs for field training.

Except for sophomore cadets on AFROTC scholarship, students incur no active-duty service commitment by taking general military courses and may drop the courses at any time within the limits of University course-drop policies. Non-ROTC students take the AS classes without any additional requirements for leadership laboratory or physical fitness.

Professional Officer Courses

Cadets selected for enrollment in professional officer courses are enlisted in the Air Force Reserve and receive a tax-free monthly subsistence stipend. They are furnished texts and uniforms. Junior- and senior-level classes consist of three hours of academic classes, three hours of leadership-laboratory and two hours of physical fitness per week. Non-ROTC students take the AS classes without any additional requirements to attend leadership laboratory or physical fitness. Non-ROTC students earn academic credits for 300- and 400-level courses, but do not earn an Air Force commission.

Financial Assistance

The Air Force offers one-, two-, and three-year scholarships to college students. AFROTC scholarships pay tuition, certain fees, and textbook reimbursement. In addition, scholarship winners receive a monthly subsistence allowance. To apply for one of these scholarships, students should contact the Unit Admissions Officer in the Department of Aerospace Studies (AFROTC), 206-543-2360 or at afrotc@u.washington.edu.

Two-Year Program

To provide for those students wishing to join AFROTC but unable to take the general military courses, a two-year professional officer course is available on a competitive basis. This program is open to graduate students and full-

time undergraduate students in select majors who will complete a bachelor's degree in two years.

Students in this program are required to attend a six-week field-training course at an Air Force base during the summer preceding program entry. The student is paid during the six-week period. Upon return to the campus, students enter the professional officer course. Uniform, texts, and a monthly subsistence are provided. Students interested in this program should contact the AFROTC department by February prior to the autumn quarter they desire to enter, at 206-543-2360 or at afrotc@u.washington.edu.

Course Descriptions

See page 620.

Military Science

104 Clark Hall

The ROTC program provides students an opportunity to learn and practice the art of leading people. Recognizing that there is a great difference between cognition and volition, the program is structured in such a way as to give the student practical experience in leading and managing resources.

The Army ROTC (AROTC) program enables the student to learn about the military profession and the role it plays in our democratic system of government. The courses enable such knowledge to be acquired on the campus without serving in the military forces.

The Army ROTC electives enrich the student's course of study. Taking these courses also opens up an additional career option, enabling the student to earn a commission and to serve in the Army as an officer, or in the Reserves or National Guard while pursuing a civilian career. Officers serve in a wide variety of career paths, including infantry, human resources, aviation, intelligence, automation, and hospital administration.

Army ROTC provides the student membership in a close-knit fraternal organization.

ROTC programs on college campuses are the nation's way of ensuring that the influences of higher education are transferred into the military services—a mandatory requirement in a democracy.

Enrollment and Scholarship Officer
105 Clark, Box 353820
206-543-9010

Traditional Four-Year Program

Open to freshman and sophomore men and women. Academic studies include courses in military history, principles of leadership, techniques of instruction, management and staff procedures, logistics, physical conditioning, and military law. Extracurricular activities include such options as Ranger Company, color guard, training exercises, field trips, and related activities. A non-scholarship student incurs no obligation of any kind during the first two years of the four-year AROTC program.

Placement credit toward completion of AROTC courses may be given for prior ROTC or military training. Veterans routinely receive full credit for the first two years of AROTC and may enter the advanced course when they are academic juniors. All military textbooks and uniform items are furnished without charge. Students in the advanced course receive tax-free monthly subsistence of \$350 per month as an academic junior and \$400 per month as an academic senior. In the advanced course, cadets are required to participate in the leadership-development program, which is a practicum of skills and principles taught during the previous two years. Between their junior and senior years, cadets attend a five-week summer camp during which they receive varied and challenging training and for which they are paid both for the time at camp and for travel expenses to and from the camp location. Upon entering the advanced course, students agree to complete the course, accept a commission upon graduation, and serve a minimum of four years if scholarship (three years if non-scholarship) and be on active-duty commitment. If the cadet chooses to go in the Reserves or National Guard, then he or she will serve a minimum of eight years.

Four-Year Scholarship Program

Application to this program should be made while the student is still in high school. Selection of students is made on a nationwide competitive basis. This program may lead to a commission in the Active Army, the Army Reserve, or the Army National Guard. All tuition, a flat rate for books and laboratory expenses, and uniform items, plus monthly tax-free stipends, is provided by the Army. The program requires four years of academic study on campus, as well as a five-week advanced camp training period between the junior and senior years, for which the cadet is paid for both time and travel expense to and from the camp location. Academic studies are identical to those of the traditional four-year program. The student must sign a contract wherein the student agrees to complete this program, along with a chosen academic program, to accept a commission, and to serve on active duty or in the reserve forces after commissioning.

Three-Year Scholarship Program

This program is open to qualified students on campus. The scholarship provides financial assistance during the remaining years of the student's enrollment. Each scholarship pays for tuition and a flat rate for books and laboratory expenses and provides tax-free monthly stipends of \$350 for academic juniors and \$400 for academic seniors. All other advantages and obligations are the same as those of the four-year scholarship program.

Two-Year or Lateral Entry Program

This program is open to qualified undergraduate and graduate students who have at least two years remaining in school and who have completed 81 credits. Students may qualify for entrance into the advanced course under this program in two ways.

First, they may participate as qualified veterans who receive placement credit for the first two years of AROTC. Veterans are also eligible to compete for two- and three-year scholarships while receiving their educational benefits. Members of the Reserves and National Guard may also be eligible to participate in AROTC and receive their commission upon graduation.

The second alternative under this program requires attendance at the Leader's Trainers Course for five weeks at Fort Knox, Kentucky. Completion of this training also qualifies students for direct entry into the advanced course. While at camp, students receive pay plus travel expenses to and from the camp location, and they may compete for two-year scholarships, provided scholarships are available.

Course Descriptions

See page 620.

Naval Science

305 Clark

The Department of Naval Science offers University students an opportunity to engage in study that leads to a commission in the U.S. Navy or Marine Corps while working toward a baccalaureate degree. The Naval Reserve Officer Training Corps (NROTC) Unit functions in conjunction with the Department of Naval Science. An NROTC student may select an academic major within certain limitations (e.g., some programs that normally lead to immediate graduate education, such as architecture, are not consistent with the mission of the NROTC program).

In addition to their University curricula, NROTC students take naval science courses in history and customs, naval engineering/weapons systems, navigation, naval operations, and leadership/management. In addition, each student must attend one naval science laboratory session and one physical training session per week. During the summer, students may have a four-to-six-week training cruise to put into practice their earlier classroom training.

Any University student may take a naval science course without enrolling in the NROTC Program. Two programs are offered.

Adviser
305 Clark, Box 353840
206-543-0170
nrotc@u.washington.edu

Navy-Marine Scholarship Program

Each year students are accepted for scholarship status in the four-year, three-year alternate, and two-year NROTC scholarship programs. Eligibility for the three- and four-year programs is based upon nationwide competition and selection by a central selection committee. Application must be made by December 1 of the academic year preceding appointment as midshipman. Those selected are provided educational benefits, including subsidy by the Navy of all tuition, fees, and uniforms. In addition, there is a textbook stipend each quarter and a monthly subsistence pay which ranges between \$250 and \$400.

For the two-year scholarship program, applications from current sophomores, or juniors enrolled in five-year programs of study, must be received by March. Those chosen by a central selection committee attend a six-week course of instruction at the Naval Science Institute (NSI) at Newport, Rhode Island, during the summer prior to their junior year. Successful completion of NSI instruction qualifies these students for enrollment in the advanced courses in the NROTC program. All scholarship students are appointed as midshipmen, USNR-R, and upon graduation are commissioned as officers in the Navy or Marine Corps Reserve, after which they serve on active duty for a minimum of four years.

Navy-Marine College Program

Each year, men and women are accepted for four- and two-year nonscholarship college programs. Applications for the two-year program are accepted from current sophomores in community colleges or four-year colleges and must be received prior to March of their sophomore year (or third year, if in a five-year program).

Those students selected for the two-year program attend a six-week course of instruction at NSI during the summer prior to their junior year. Successful completion of NSI instruction qualifies students for enrollment in the advanced course in the NROTC program. Students in the NROTC college program pay their own college expenses but receive monthly subsistence pay during their junior and senior years. The Navy furnishes all uniforms and textbooks used in naval science courses.

All college-program students are eligible for a scholarship after completing one academic term, with scholarship awards based on academic grades and participation within the midshipman battalion. The two-year college-program students also may win a scholarship for superior performance at NSI. Upon graduation, college-program students are commissioned in the Navy Reserve or Marine Corps Reserve and serve on active duty for three years.

Course Descriptions

See page 621.

School of Social Work

Dean

Dorothy Van Soest

210 Social Work/Speech and Hearing Sciences

The School of Social Work offers two professional programs, one at the undergraduate level and one at the graduate level, as well as a Ph.D. program. The undergraduate program prepares students for entry-level generalist practice; students earn the Bachelor of Arts in Social Welfare degree. The graduate professional program prepares students for advanced practice within a field of concentration; students earn a Master of Social Work degree. Both professional programs are accredited by the Council on Social Work Education. The School also offers a Doctor of Philosophy degree in social welfare that prepares students for careers in research and education. For the three programs, no credit is granted on the basis of life experience or previous employment. All three programs are housed in the Social Work/Speech and Hearing Sciences Building, 4101 Fifteenth Avenue Northeast, Seattle, WA 98105-6299.

In addition, the School offers a concurrent degree program with the School of Public Health and Community Medicine leading to the M.S.W. and M.P.H. degrees.

Undergraduate Program

Adviser

23D Social Work, Box 354900
206-543-8617
sswstsr@u.washington.edu

The School of Social Work offers the following program of study

- * The Bachelor of Arts with a major in Social Welfare

The program includes upper-division courses in social welfare, with prerequisites in human biology, economics, psychology, statistics, and sociology. Students enter the major at the start of their junior year after completing most of the liberal arts requirements established by the College of Arts and Sciences. Social welfare courses during a student's junior and senior years include content on social welfare history, policy and services, human behavior and the social environment, social welfare practice, social welfare research, and cultural diversity. These academic courses prepare students for the senior year's three-quarter practicum experience, which involves a total of 400 hours of direct social services under the supervision of a practicum instructor approved by the School.

Bachelor of Arts

Suggested First- and Second-Year College Courses:

SOC WF 101, SOC WF 200; PSYCH 101; SOC 110; BIOL 100 or BIOL 118; ECON 200 or ECON 201; also courses in American ethnic studies, sociology, psychology, and women studies.

Department Admission Requirements

Approximately 60 juniors are admitted to the social welfare major each academic year. Admission, which is for autumn quarter only, is competitive and completion of the requirements listed below does not guarantee acceptance. May 1 is the application deadline. To be considered for admission to the program applicants must meet the following criteria by the time of application:

1. Completion of a minimum of 65 credits.
2. Completion of the following courses: PSYCH 101 (or PSYCH 102); introductory sociology; ECON 100, ECON 200, or ECON 201; and BIOL 100 or BIOL 118, with a minimum grade of 2.0 in each course.
3. A minimum 2.00 cumulative GPA.
4. Have some paid or volunteer social service experience.
5. Applicants must submit a completed application, admissions essay, résumé, and provide copies of their college transcripts.

Application forms and a detailed description of the social welfare major are available at the School's admissions office, 23C Social Work/Speech and Hearing Sciences (SWS), or will be mailed upon request, 206-543-5676. A student may discuss the program in person by contacting the Director of Admissions, 206-543-5676, sswadmis@u.washington.edu. Students

accepted to the major complete a change-of-college form and transfer their academic file to the School's Student Services Office. Students not accepted may contact the Director of Admissions to discuss alternatives to the social welfare major, or the appeal process.

Major Requirements

66 credits as follows:

- * Junior year (34 credits) -- SOC WF 200 (5); SOC WF 310 (3); SOC WF 315 (2, 2, 2); SOC WF 320 (5); SOC WF 402 (5); SOC WF 403 (5); and SOC WF 404 (5).
- * Senior year (32 credits) -- SOC WF 311 (3); SOC WF 312 (3); SOC WF 390 (5); SOC WF 405 (9); SOC WF 415 (12).

Student Outcomes and Opportunities

- * *Learning Objectives and Expected Outcomes:* The undergraduate program produces beginning-level social work practitioners and is accredited by the Council on Social Works Education. Students become generalist social work professionals able to work with individuals, families, groups, communities, and organizations in enhancing the health, well being, and empowerment of disadvantaged communities across the lifespan. Graduates may pursue social work practice jobs, or graduate education in social work, or a range of other fields (e.g., law, medicine, public policy, international development). Students receive an interdisciplinary liberal arts education, drawing on a range of social science courses which prepare them to promote human welfare and deal with complex social problems. Students are involved in both academic coursework (gaining intellectual knowledge and critical thinking skills) and a field placement experience ("lived" or "on the ground" experience). The program assists students in integrating scholarship, research, service, and experience to promote human welfare, engaged citizenship, and multiculturalism.

The following outcomes define the BASW program:

1. Preparation of entry-level baccalaureate social workers for generalist practice in a multicultural context.
2. Education and training of generalist social workers who are informed, engaged, and responsive practitioners, able to understand and take action in enhancing human welfare and in promoting social and economic justice.
3. Education of students within the context of an interdisciplinary liberal arts education, to foster a comparative and critical examination of social welfare and social work through the study of its history, policies, research, and practice interventions.
4. Preparation for graduate education.

- * *Instructional and Research Facilities:* The Social Work Computer Lab provides equipment and services for Web site creation and incorporating technology into teaching and learning. The Media Lab provides equipment and services related to the production of online streaming audio and video as well as still digital images and the incorporation of digital media into Web sites and paper formats. The Social Work Library, a branch of the Health Sciences Libraries, is located on the second floor of the Social Work/Speech and Hearing Sciences Building. The library's collection contains more than 200 current periodicals, 37,000 bound volumes, and a host of electronic resources covering the various areas of social work and social welfare, specifically aging, children and youth, crime, ethnicity, families, health care, housing, mental health, poverty, social policy, and welfare.

In addition, the School of Social Work houses a number of centers and projects. For more information on these research activities, visit depts.washington.edu/sswweb/centers_proj.html.

- * *Honors Options Available:* None offered.

- * *Research, Internships, and Service Learning:* Community service learning experiences are available for first- and second-year B.A.S.W. students. In the second (senior) year of the major, students enroll in SOC WF 415 practicum (12 credits, 4 per quarter). The practicum requires 400 hours in an agency selected by the School and with qualified supervision. Please contact the adviser for more information.

* *Department Scholarships:* A limited number of financial-aid opportunities are available to students. Applicants are urged to apply for assistance through the Office of Student Financial Aid by February 15. Completion of the Free Application for Federal Student Aid (FAFSA) is required for consideration for any departmental funding. Inquiries may be directed to the Chair of the Scholarship Committee, School of Social Work.

* *Student Organizations/Associations:* Organization of Student Social Workers (OSSW)

Graduate Program

Graduate Program Coordinator
Box 354900
206-543-8617
sswstsr@u.washington.edu

Master of Social Work

The School of Social Work offers a Master of Social Work degree with four options for completion: a two-year full-time program; a one-year Advanced Standing program for qualified students with a degree in social work/social welfare from an accredited undergraduate program; a three-year Evening Degree program; and a three-year MSW Outreach program.

All program options prepare students for advanced professional practice with a culturally diverse range of at-risk populations in publicly funded social services. The curriculum encompasses two distinct but interconnected areas: the beginning content or professional foundation, and opportunities for advanced content in areas of policy, services, and methods.

The professional foundation provides instruction in the basic knowledge and skills required for effective, generalist social work practice, as well as socialization to the profession, its value orientation, ethics, and history.

The advanced curriculum provides in-depth knowledge and skills needed for advanced practice in the social work profession. At the time of publication, the advanced curriculum is being revised. Please check the School's Web page (depts.washington.edu/sswweb/) for the most current information.

Students in the Evening Degree and Outreach options may also select from courses in advanced policy services and methods. Elective offerings are determined by a vote of students in the cohort.

Admission Requirements

Admission to the M.S.W. program requires formal admission to the Graduate School as well as to the School of Social Work. Applicants are required to have a bachelor's degree, a strong academic background, and social-service experience. Applicants must submit official transcripts from all colleges and universities attended, references, application forms, Graduate Record Examination scores, résumé, and an admission essay to be considered for autumn-quarter entry. January 15 is the closing date for receipt of applications and materials. Admission is competitive and selection is based on a review of the applicant's submitted materials. Current application materials can be obtained from the School's Admissions Office, 23 Social Work/Speech and Hearing Sciences Building, or by calling 206-543-5676 in Seattle or 1-800-558-8703.

Degree Requirements

Minimum 46 credits (Advanced Standing program); 75 credits (Day and Extended Degree programs), as follows:

- * M.S.W. program requirements include completion of required professional foundation and advanced curriculum credits and demonstrated competence in both academic and field practicum work.
- * Human Biology Requirements: BIOL 100, BIOL 101-, BIOL 118, BIOL 161, NUTR 300, or GENOME 261 (or equivalent), taken within ten years before or during the M.S.W. program. Course must be completed before beginning the advanced year (including practicum). Credit may not be applied to the M.S.W. degree. Courses in nutrition, psychobiology of women, and biology of aging also fulfill this requirement.
- * Basic Statistics Requirement: An introductory course in statistics (any discipline) is a prerequisite for SOC W 505, taken in the second quarter of the foundation year for day students and fall term of the second year for extended degree students.

* Professional Foundation Courses Required for the Day and Extended Degree Program: SOC W 500 (3), SOC W 501 (3), SOC W 504 (1-3), SOC W 505 (3), SOC W 506 (3), SOC W 510 (3), SOC W 511 (3), SOC W 512 (3), SOC W 513 (3), SOC W 514 (3), SOC W 523 (1), SOC W 524 (1-8), SOC W 525 (1-10). All foundation courses must be completed before beginning the advanced curriculum.

* Advanced Curriculum for the M.S.W. Day Program: Specialization in an advanced methods area in combination with a particular population or problem focus. Areas of concentration might include policy practice in health care, clinical practice in transnational communities, administration in mental health settings, or clinical and contextual practice with a focus on low-income children and families. Students enter the second year with an Individualized learning plan (developed by winter quarter of their foundation year) that sets out a coherent program of advanced study. Identified in the learning plan is a policy/services course, an advanced methods area, an advanced field practicum, and proposed choices for methods and elective courses that support the student's overall area of concentration.

A minimum program of study includes:

- o One policy/services course (3 credits), consistent with the student's second year specialization
- o Two advanced methods (6 credits) in the student's primary method area or across methods with the approval of the faculty adviser and practicum coordinator
- o Elective course offerings (9 credits) to include courses related to the policy/services areas, and advanced HBSE and theory courses, with the primary focus on development of knowledge and skills in intervention. Students are encouraged to take one elective course from outside the school. Elective courses range from 1 to 3 credits.
- o Advanced practicum (18 credits) aligns with the student's policy/services course and with the student's primary intervention method area.

* Advanced Curriculum for the M.S.W. Extended Degree Program: Consists of an advanced generalist policy/services course, a two-quarter advanced generalist practice sequence, three electives, and a 720 hour advanced generalist practicum. Students consult with their adviser and practicum coordinator to determine electives and a practicum appropriate to the student's career goals. Students graduate with theory, knowledge, and skills to assess, intervene, and evaluate across levels of social work practice -- from micro to mezzo to macro -- and across client populations and practice settings.

* M.S.W. Electives: Courses may be selected from curriculum offerings related to particular fields of practice, intervention theories, intervention modalities, social problems, populations, and research methods. Students may take advanced methods courses in areas other than the student's primary methods area and relevant courses in other graduate programs and professional schools of the University. Three credits of external coursework may be included.

Financial Aid

A limited number of financial-aid opportunities are available to students. Applicants to the M.S.W. program are urged to apply for assistance through the Office of Student Financial Aid by February 15. Completion of the Free Application for Federal Student Aid (FAFSA) is required for consideration for any departmental funding. Departmental funding is limited. Inquiries may be directed to the Chair of the Scholarship Committee, School of Social Work.

Doctor of Philosophy in Social Welfare

The Ph.D. program in social welfare prepares students to contribute to the advancement of knowledge and practice in the field of social welfare and the profession of social work for the promotion of social justice. The program builds on the premise that social welfare scholarship must be scientifically based, responsive to service and practice needs, and informed of developments in related fields and disciplines.

After the first year of required courses, each student's program of study is individually designed and focuses on well-defined substantive and interventive areas of research relevant to the field of social welfare. In the basic core of required courses, which include teaching and research practice, students have an opportunity to pursue their particular interests with faculty members in the School of Social Work and in other schools and departments.

During the first two years, students are expected to define and develop the specialized areas that will be the focus of their General Examination and, typically, their subsequent dissertation research. The selected areas must have clear significance for the development of practice, programs, or policies in social work and social welfare.

The General Examination for advancement to candidacy generally occurs at the end of the second year or early in the third year. After advancement to candidacy, students devote themselves full time to completion of their dissertation research. The last step before award of the degree is the Final Examination, which serves as the defense of the dissertation. Students are strongly encouraged to remain in residence at the University until the dissertation is accepted. The Ph.D. program is designed to take approximately four years, although academic excellence in learning and performance is always the first criterion for degree progress.

Admission Requirements

Admission is highly selective and students are admitted for autumn-quarter entry only. Applicants should have a master's degree in social work or comparable preparation in a closely related field.

The Council on Social Work Education requires that faculty who teach practice courses in accredited programs have two years of supervised practice experience. Thus, obtaining such experience is highly important for those who seek academic positions following graduation.

Applicants selected for admission are those whose scholastic achievements, previous experience, and aptitude for social welfare research, scholarship, and teaching indicate the greatest promise for achieving the objectives of the program. In addition, an effort is made to maintain a balanced student group reflecting the range of concerns in social welfare and of faculty resources. The deadline for receipt of admission material is January 2. For more information, call 206-685-1680, or email phdmhpr@u.washington.edu.

Degree Requirements

90 credits minimum, as follows:

- * Required Courses: All required Ph.D. courses must include content on diverse populations, including the disadvantaged and oppressed. This includes content on people of color, women, gay men and lesbians, and persons with disabilities. The specific type or nature of the content (e.g., readings, exemplars, exercises) and how it is introduced and integrated will likely differ across courses. In all cases, content on diversity must be in accord with course objectives and be visibly present in the course syllabus.

All required coursework (with the exception of the 800 tutorials) must be completed before or during the quarter in which the oral section of the General Examination takes place.

The following courses are required of all students in the program and must be taken on a graded basis unless only offered as Credit/No Credit Only (i.e., they cannot be taken on a Satisfactory/Non Satisfactory basis).

- o Introduction to Advanced Research Methods and Design. Two quarters during first year.
- o Fundamentals of Social Work Statistics. Two quarters during the first year.
- o Research Issues and Priorities in Social Welfare. Two quarters during the first year.
- o Social Welfare Policy. Three quarters during the first year (analytical perspectives on policy, international and global policy, and contemporary policy).
- o Research Practicum. Two quarters; to be completed by the end of the second year. (Credit/No Credit Only.)

- o Teaching Practicum. One quarter; to be taken after successful completion of first year. (Credit/No Credit Only)
- o Doctoral Seminars. One-credit seminars in the first year (Credit/No Credit Only). These focus on professional development issues and skills with emphasis on academic and research careers.
- o Teaching Preparation. One quarter in the second year.
- o A minimum of two (3+ credit) courses in advanced graduate research methods (typically 500 level courses offered in other departments) relevant to the student's anticipated research in a substantive or interventive area. Coursework beyond the minimum is encouraged.
- o A minimum of two (3+ credit) graduate social science theory courses (500 level or above), designed to provide strong theoretical foundations. Students often use them to develop a "minor" in one of the social sciences. These courses are in the College of Arts and Sciences or in one of the professional schools and are related to the substantive or interventive content of the student's program. Coursework beyond the minimum is encouraged for greater depth of interdisciplinary theoretical training.
- o Dissertation Tutorials (SOC WL 800). Taken after the student has successfully completed the Oral General Examination and has been advanced to candidacy for the Ph.D. Students must complete a total of 27 credit hours over at least 3 quarters to satisfy the Graduate School requirement

- * Elective Courses in the School of Social Work
 - o Qualitative Methods in Social Work Research. One or two quarters offered every other year.
 - o Advanced Topics in Data Analysis. One quarter offered annually, covering advanced quantitative methods.
 - o Social Movements and Participatory Action Research Methods. One quarter.
 - o Interdisciplinary Prevention Science. Three-credit course
- * Additional Course Expectations: In addition to required courses, students may also take tutorials (SOC WL 600) with faculty members while completing advanced coursework and writing the integrative paper (prior to the oral General Examination). These tutorials should include one or more written products.

Students are also encouraged to take additional courses that bear on their substantive areas of interest. Courses may be taken in any department or school of the University but should ordinarily be at the 500 level or above.

- * Prevention Research Training Program Courses: (Trainee requirements in addition to all Ph.D. program courses)
 - o Seminar in Prevention Science. One-credit seminars taken autumn, winter, and spring quarters each year of the traineeship. Credit/No Credit Only.
 - o Introduction to Prevention Science. Three-credit course taken spring of first year in the training program.
 - o Two additional graduate level (500+) courses, one social science theory and one research methods, related to the prevention research area of study.

Financial Aid

Stipends, scholarships, teaching and research assistantships, and tuition waivers are available. Every effort is made to provide aid to each student who requires it, and research and teaching assistant positions are provided to all Ph.D. students for at least the first three years. The financial assistance provided is not usually adequate to cover all educational and living expenses. Financial-aid forms required for financial assistance must be submitted by February 15 by completing the Free Application for Federal Student Aid (FAFSA).

Course Descriptions

See page 622.

Course Descriptions

Undergraduate Interdisciplinary Programs

Program on the Environment

ENVIR 100 Environmental Studies: Interdisciplinary Foundations (5) I&S/NW *Whitlow* Introduces the interdisciplinary approach to environmental studies. Examines the ethical, political, social and scientific dimensions of current and historical environmental issues, at the local and global scale. First in a three course sequence required of Environmental Studies majors. Offered: A.

ENVIR 101 The Living Aquatic World (5) I&S/NW Freshwater and marine biodiversity, population, biology, ecosystem structure and function, evolution, conservation genetics, physiology, aquaculture, environmental effects of human activities, role of law, government, and human communities in resource conflicts management. Three case studies. Suitable for non-majors. Offered: jointly with FISH 101.

ENVIR 103 Society and the Oceans (5) I&S/NW Explores the social and policy dimensions of the ocean environment and ocean management policy. Attention to how human values, institutions, culture, and history shape environmental issues and policy responses. Examines case studies and influential frameworks, such as the ocean as "tragedy of the commons". Offered: jointly with SIS/SMA 103.

ENVIR 110 Introduction to Environmental Science (5) I&S/NW *Harrison* Covers the importance of the environment in society with particular emphasis on worldwide distribution and uses of resources, the role of natural and man-made environments, and causes of environmental degradation. Introduces ethics of conservation and recycling. Offered: jointly with ESRM 100; AWSpS.

ENVIR 150 Orientation to Environmental Studies (2) Broad overview of environmental studies. Faculty members and professionals from outside the University identify opportunities for study and work in the field and offer suggestions for optimal academic preparation. Strong emphasis on class participation and experiential learning.

ENVIR 200 Environmental Studies: Research and Communication (5) I&S Builds interdisciplinary analytical skills needed to study complex environmental problems. Develops proficiency using electronic databases, scholarly journals, and Internet as research tools. Hones students' ability to write and speak effectively about multifaceted environmental issues. Second in three course series required of Environmental Studies majors. Prerequisite: ENVIR 100. Offered: W.

ENVIR 201 Environmental Case Studies: Ecology and Conservation (5, max. 10) I&S/NW Exploration of ecology and conservation case studies from natural science, historical, socioeconomic, legal, political, and ethical perspectives. Involves gathering information, analyzing data, applying mathematical and

statistical reasoning and decision-making schemes, evaluating conflicting views based on cultural and philosophical frames of reference, and developing communications and research skills.

ENVIR 202 Environmental Case Studies: Population and Health (5, max. 10) I&S/NW Exploration of population and health issues or case studies from natural science, historical, socioeconomic, legal, political, and ethical cultural perspectives. Involves gathering information, analyzing data, applying mathematical and statistical reasoning and decision-making schemes, evaluating conflicting views based on cultural and philosophical frames of reference, and developing communications and research skills.

ENVIR 203 Environmental Case Studies: Resources (5, max. 10) I&S/NW Exploration of resource environmental issues from natural science, historical, socioeconomic, legal, political, and ethical perspectives. Involves gathering information, analyzing data, applying mathematical and statistical reasoning and decision-making schemes, evaluating conflicting views based on cultural and philosophical frames of reference, and developing communications and research skills.

ENVIR 220 Urban Ecology (5) I&S/NW Examines nature-society interactions in urban settings. Drivers, patterns, processes, impacts and consequences of urban and urbanizing ecosystems. Presents the state of our knowledge of urban ecology in its interdisciplinary format. Offered: W.

ENVIR 215 Earth, Air, Water: The Human Context (5) NW *Rhines* Lab-based introduction to Earth's environment, primarily for non-scientists: energy, atmosphere, ocean, and biosphere stability. Beginning from basic science, growing toward impacts and applications; e.g., study of the sun's energy spectrum and greenhouse effect, construction of solar box cookers, study of energy profiles of developing countries. Offered: Sp.

ENVIR 235 Introduction to Environmental Economics (5) I&S/NW Introduces non-economics majors to environmental and natural resource economics. Discussion of fundamental economic concepts, including markets and private property. Students learn basic tools used in the economic assessment of environmental problems and apply these methods to key environmental issues. Offered: jointly with ECON 235.

ENVIR 243 Environmental Ethics (5) I&S *Clatterbaugh, Coburn, Woody* Focuses on some of the philosophical questions that arise in connection with environmental studies. Topics to be considered include: the ideological roots of current issues, values and the natural world, public policy and risk assessment, intergenerational justice, and social change. Offered: jointly with PHIL 243.

ENVIR 260 The Puget Sound Ecosystem (3/5) I&S/NW Examines historical human impacts on

the land/water ecosystem of the Puget Sound, roles of regional governance and citizen action, and prospects for ecological restoration. Computer labs and field trips for additional credit. Offered: jointly with OCEAN 260.

ENVIR 296 Study Abroad – Environmental Studies (1-15, max. 15) Environmental studies course taken through an approved study abroad program, for which there are no direct UW equivalents. Credit does not apply to major requirements without approval.

ENVIR 300 Environmental Studies: Synthesis and Application (5) I&S/NW Multi-scale case studies of socially and scientifically complex environmental problems, including how the Earth works as a biogeochemical system, ecological principles, human health, energy, and global change. Emphasizes quantitative environmental analysis. Third in a required three course series of Environmental Studies majors. Prerequisite: ENVIR 200; recommended: ENVIR major foundational courses. Offered: Sp.

ENVIR 313 Environmental Earth Science (5) NW *Swanson* Analysis of geologic constraints upon human activity and the environmental consequences of such activity. Topics include hillslope processes, fluvial and groundwater processes, earthquake and volcanic hazards, and environmental aspects of deforestation and atmospheric pollution. Prerequisite: either ESS 101, ESS 210, ESS 211, GEOL 101, GEOL 201, or GEOL 205. Offered: jointly with ESS 315; A.

ENVIR 341 Energy and Environment (3) NW *Malte* Energy use. Fossil energy conversion. Oil, gas, coal resources. Air impacts. Nuclear energy principles, reactors, fuel cycle. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 114, or PHYS 121. Offered: jointly with M E 341/CHEM E 341; A.

ENVIR 350 Independent Fieldwork (1-3, max. 5) Fieldwork, coursework, or other learning experience conducted off-campus, but supervised by UW faculty. 1 academic credit for 30 hours of environment-related work per quarter. Credit/no credit only.

ENVIR 360 Environmental Norms in International Politics (5) I&S *Ingebrietsen* Surveys development of international environmental consciousness from 1960s to present. Models of "green development"; ways in which norms for resource use have entered global politics. Patterns of state compliance with international environmental agreements, and why states fall short of meeting their international obligations. Offered: jointly with SCAND 350/SIS 350.

ENVIR 362 Introduction to Restoration Ecology (5) I&S/NW *Gold* An introduction to ecological restoration of damaged ecosystems. Examines the philosophical base of restoration as well as the social, biological and political forces that impact the success of any restoration project. Includes lectures, readings, case studies and field trips. Offered: jointly with ESRM 362; A.

ENVIR 371 Anthropology of Development (5) I&S *Sivaramakrishnan* Development refers to social, economic, cultural, political transformations viewed as progress. Studied from anthropological perspectives. Historical, social context for emergence of ideas of development. Role of development in promoting national cultures. Impact of development on individual citizenship, families, rural-urban relations, workers, business, environment. Prerequisite: one 200-level ANTH course. Offered: jointly with ANTH 371.

ENVIR 379 Environmental Sociology (5) I&S/NW *Lee* Social processes by which environmental conditions are transformed into environmental problems; scientific claims, popularization of science, issue-framing, problem-amplification, economic opportunism, and institutional sponsorship. Examination of social constructs such as ecosystem, community, and free-market economy. Use of human ecology to assess whether the current framing of environmental problems promotes ecological adaptability. Offered: jointly with ESRM 371/SOC 379; WS.

ENVIR 380 Study Abroad: Comparative International Perspectives on Cities and the Environment (15) I&S/NW Interdisciplinary approach to integrating urban and environmental issues in two or more world cities. Includes site visits and interactions with foreign scholars and practitioners. Topics may include coastal development, transportation, parks, marine conservation, indigenous cultures, environmental planning, gentrification, urban governance, and watershed management. Offered: jointly with TEST/T URB 380.

ENVIR 384 Global Environmental Politics (5) I&S Examines the globalization of environmental problems, including climate change, ozone depletion, and loss of biodiversity, as well as the globalization of political responses to these problems within the framework of globalization as set of interlinked economic, technological, cultural and political processes. Offered: jointly with POL S 384.

ENVIR 415 Sustainability and Design for Environment (3) Cooper Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with CEE 495/M E 415; S.

ENVIR 416 Ethics and Climate Change (5) I&S *Gardiner* Critical examination of the ethical issues surrounding climate change. Prerequisite: either one philosophy or one environmental studies course. Offered: jointly with PHIL 416.

ENVIR 418 Communications and the Environment (5) I&S Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with COM 418.

ENVIR 433 Environmental Degradation in the Tropics (5) I&S/NW Considers theories and controversies of environmental degradation in the tropics, ecological and social case studies of Central American rain forests and Southeast

Asian coral reefs, and implications of environmental management techniques. Offered: jointly with SIS 433/SMA 433.

ENVIR 439 Attaining a Sustainable Society (1/3, max. 3) I&S/NW *Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with FISH 439; A.

ENVIR 442 Renewable Energy (4) NW *Malte* Introduction to renewable energy. Principles and practices: solar, wind, water, and biomass energy conversion. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 115, or PHYS 122. Offered: jointly with CHEM E 442/M E 442; W.

ENVIR 450 Special Topics in Environmental Studies (1-5, max. 15) Format may range from seminar/discussion to formal lectures to laboratory or modeling work.

ENVIR 451 Comparative Historical and Social Ecology of the Tropics (5) I&S *Sivaramakrishnan* Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Prerequisite: ANTH 210. Offered: jointly with ANTH 451.

ENVIR 459 Culture, Ecology and Politics (5) I&S *Pena* Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ANTH 459.

ENVIR 460 Institutionalizing Sustainable Ecological Practices. (5) I&S/NW *Lee* Introduction to how sustainability and conservation are possible. Case studies of successful institutionalization of sustainable ecological functions, including curbside and biosolids recycling, ecological restoration, bioremediation, sustainable wood production, and product certification. Emphasis on individual student projects. Offered: jointly with ESC 460; Sp.

ENVIR 462 Restoration Ecology Capstone: Introduction (2) NW First of a three-course capstone sequence in restoration ecology. Students review and assess project plans and installations. Class meets with members of previous capstone classes to review their projects. Offered: jointly with ESRM/TESC/BES 462.

ENVIRO 463 Restoration Ecology Capstone: Proposal and Plan (3) NW Student teams prepare proposals in response to requests for proposals (RFPs) from actual clients. Clients may be governments, non-profit organizations, and others. Upon acceptance of the proposal, teams prepare restoration plans. Prerequisite: ENVIRO 462. Offered: jointly with ESRM/TESC/BES 463.

ENVIRO 464 Restoration Ecology Capstone: Field Site Restoration (5) NW Teams take a restoration plan developed in ESRM 463 and complete the installation. Team participation may

include supervision of volunteers. Teams prepare management guidelines for the client and conduct a training class for their use. Prerequisite: ENVIRO 463. Offered: jointly with ESRM/TESC/BES 464.

ENVIR 474 Problem Analysis in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with GEOG 486/CFR 474; A.

ENVIR 475 Environmental Impacts of Small Scale Societies (5) I&S/NW *Grayson, Smith* Examines the environmental impacts (positive and negative) among prehistoric and historic/ethnographic small-scale (hunter-gatherer and horticultural) societies worldwide, and debates these impacts, within a theoretical framework provided by evolutionary ecology and biogeography. Offered: jointly with BIO A 475.

ENVIR 476 Introduction to Environmental Law and Process (3) I&S *Bryant, Hershman* Use and application of key statutes in marine living resources management. Overview of administrative law and process. Basic legal research, reading, and briefing selected judicial opinions. Participatory case study component. Designed for non-law graduate and advanced undergraduate students. Offered: jointly with SMA 476; A.

ENVIR 477 Marine Conservation (3) NW *Parrish* Terrestrially based concepts of conservation biology applied to marine systems: human activities affecting the marine environment including fishing and pollution, influence of legal and cultural frameworks, and ecosystem management. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: jointly with BIOL 477; W.

ENVIR 478 Topics in Sustainable Fisheries (3, max. 9) Parrish Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with FISH 478/BIOL 478; odd years; W.

ENVIR 480 Marine Resource Conservation and Management (3) I&S/NW *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480/SMA 480.

ENVIR 486 Problem Analysis in Urban Ecology (5) NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly

with ESRM 474/GEOG 486/URBDP 443; A.

ENVIR 487 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: either ENVIR 486, CFR 474, or GEOG 486. Offered: jointly with CFR 475/GEOG 487; W.

ENVIR 488 Research in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised objectives and methods sections of interdisciplinary project and present results section. Prerequisite: either ENVIR 486, CFR 475, or GEOG 487. Offered: jointly with CFR 476/GEOG 488; Sp.

ENVIR 490 Pre-Capstone Seminar (2) Critique readings on environmental education and applied environmental work. Define a capstone experience based on personal interests and skills and complete a learning contract and a contextual bibliography for ENVIR 491. Recommended: 15 credits of ENVIR 201/202/203. Offered: ASp.

ENVIR 491 Capstone Experience (2-8, max. 8) Capstone experiences, arranged during ENVIR 490, may include internships and other applied

environmental work, directed research on environmental topics, or team efforts. Credit/no credit only. Prerequisite: ENVIR 490. Offered: AWSpS.

ENVIR 492 Post-Capstone Seminar (3) Build writing skills around course readings and discussion. Complete three final products: a capstone analysis paper summarizing and contextualizing work in ENVIR 491; an integrative essay reflecting on personal education; and a formal capstone presentation. Prerequisite: ENVIR 491. Offered: ASP.

ENVIR 498 Independent Study (1-3, max. 5) Independent reading and/or research. Limited to majors and minors in Environmental Studies.

ENVIR 500 Graduate Seminar in Environmental Studies (1-5, max. 15) Exploration of multidisciplinary themes in environmental studies. Topics vary.

ENVIR 501 Graduate Seminar in Environmental Management (1-5, max. 15) Addresses a contemporary interdisciplinary issue in environmental management by integrating the perspectives and theories of science/technology, public policy, and business. Format emphasizes interactive, hands-on approaches to problem solving, with visiting lectures by academic and/or external practitioners.

ENVIR 521 Business Strategy and the Natural Environment (4) Applies economic and business principles (marketing, accounting, operations) to understand interactions between business and

the natural environment and how environmental issues influence business strategy. Theory and case studies explore strategies that both respond to and seek competitive advantage from firms' interactions with the environment.

ENVIR 535 Foresight in Science and Technology: Choices and Consequences (3) Examination of the foresight (or lack of it) with which we practice science and use technology. Contrasts potential risks of various choices with potential benefits. Credit/no credit only. Offered: jointly with PHYS 535/PHIL 501/ZOOL 523.

ENVIR 550 Global Commercialization of Environmental Technologies (4) Students work on faculty-supervised interdisciplinary teams (with students from business, sciences/engineering, and public policy) developing business plans for commercializing environmentally friendly technologies around the world. The projects involve collaborating with the EPA's Environmental Technology Commercialization Center, with Battelle Labs, and with Puget Sound businesses. Offered: jointly with B BUS 550.

ENVIR 585 Climate Impacts on the Pacific Northwest (4) *Mantua, Snover* Knowledge of past/future patterns of climate to improve Pacific Northwest resource management. Topics include: the predictability of natural/human-caused climate changes; past societal reactions to climate impacts on water, fish, forest, and coastal resources; how climate and public policies interact to affect ecosystems and society. Offered: jointly with ATM S/ESS/SMA 585; Sp.

College of Architecture and Urban Planning

Architecture

ARCH 100 Introduction to Architecture Study (8) VLPA Introduces design studio instruction to students contemplating architecture as a field of study of career. Studio projects, informed by workshops, lectures, readings, field trips, and in-studio critiques introduce the history, theory and practice of architecture. Includes instruction in basic design drawing and model making. Offered: S.

ARCH 150 Appreciation of Architecture I (2/3) VLPA Historical survey of the architecture of Western civilization. For nonmajors.

ARCH 151 Appreciation of Architecture II (2/3) VLPA Historical survey of the architecture of Western civilization. For nonmajors.

ARCH 200 Introduction to Environmental Design and Planning (3) I&S/VLPA Lectures, demonstrations introducing basic curricular elements. Development of basic skills in methods and graphic expression of design and planning process-analysis, synthesis, evaluation in building technology; simulation, modeling; person-environment relations; history; theory; policy; professional roles.

ARCH 210 Design Drawing I (4) VLPA *Ching* Projects, lectures, demonstrations, and exercises to develop skill in freehand drawing and an understanding of drawing as a vital means to see, analyze, and represent essential aspects of the visual environment.

ARCH 211 Design Drawing II (4) VLPA *Ching* Projects, lectures, demonstrations, and exercises

to introduce the language of architectural drawing, with emphasis on freehand drawing as the primary means to imagine, explore, and develop design ideas. Prerequisite: ARCH 210.

ARCH 220 Introduction to Architectural Structures (2) Onouye Introduces basic structural behavior and concepts of structural systems. Uses lectures, demonstrations, and testing of student-built projects to examine structural concepts of systems, subsystems, and components in a non-numerical manner. Prerequisite: ARCH 210.

ARCH 251 World Architecture: Non-Western Cultures (3) I&S/VLPA *Prakash* Introduction to historical and contemporary built environments of non-Judeo-Christian civilizations, primarily Hindu, Buddhist, Islamic, and Meso-American, as manifestations of cultural history and as responses to environmental determinants. Offered: Sp.

ARCH 300 Introduction to Architectural Design I (6) Studio problems to develop awareness, knowledge, and basic skills needed in the synthesis of building form.

ARCH 301 Introduction to Architectural Design II (6) Studio problems to develop awareness, knowledge, and basic skills needed in the synthesis of building form. Prerequisite: ARCH 300.

ARCH 302 Introduction to Architectural Design III (6) Studio problems to develop awareness, knowledge, and basic skills needed in the synthesis of building form. Prerequisite: ARCH 301.

ARCH 303 Introduction to Design Studio I (6) Studio problems to develop initial awareness, knowledge, and basic skills needed in synthesis of building form and integrative aspects of architectural design with emphasis on the dwelling place. Limited to students entering the graduate program in architecture with baccalaureate degrees in other fields.

ARCH 304 Introduction to Design Studio II (6) Studio problems to develop initial awareness, knowledge, and basic skills needed in synthesis of building form and integrative aspects of architectural design with emphasis on the dwelling place. Limited to students entering the graduate program in architecture with baccalaureate degrees in other fields.

ARCH 305 Introduction to Design Studio III (6) Studio problems to develop initial awareness, knowledge, and basic skills needed in synthesis of building form and integrative aspects of architectural design with emphasis on the dwelling place. Limited to students entering the graduate program in architecture with baccalaureate degrees in other fields.

ARCH 310 Architectural Design Drawing I (3) Lectures, demonstrations, and exercises to develop skill in graphic visualization and representation as used in architecture. Concepts, conventions, and techniques of both freehand and technical drawing are used as a vital means to imagine, develop, and represent design ideas. Course material coordinated with 303 studio to integrate drawing in all phases of the design process.

ARCH 311 Architectural Design Drawing II (3) Lectures, demonstrations, and exercises to

develop skill in graphic visualization and representation as used in architecture. Concepts, conventions, and techniques of both freehand and technical drawing are used as a vital means to imagine, develop, and represent design ideas. Course material coordinated with 304 studio to integrate drawing in all phases of the design process.

ARCH 312 Architectural Design Drawing III (3) Lectures, demonstrations, and exercises to develop skill in graphic visualization and representation as used in architecture. Concepts, conventions, and techniques of both freehand and technical drawing are used as a vital means to imagine, develop, and represent design ideas. Course material coordinated with 305 studio to integrate drawing in all phases of the design process.

ARCH 314 Introduction to Architectural Drawing (2) Skill development in conceptualization of forms and their relationships through observation and recording in freehand graphic manner. Proportion, scales, light effect, value, texture, and various perspective techniques.

ARCH 315 Design Drawing III (2) Projects, lectures, demonstrations, and exercises coordinated with studio projects to integrate drawing in all phases of the design process. Lessons in diagramming of design concepts and planning and presenting design solutions. Prerequisite: ARCH 211; corequisite: ARCH 300.

ARCH 316 Design Drawing IV (3) *Zuberbuhler* Lectures, demonstrations, and exercises to develop drawing skills and techniques applicable to architectural design problems. Topics include advanced perspective construction, shade and shadow calculations, descriptive geometry, topographical manipulation, and additional appropriate topics at the request of the class. Prerequisite: ARCH 315.

ARCH 320 Introduction to Structures I (3) Statics — Force analysis; the study of external forces and force systems and their analytical solutions as applied to bodies at rest (equilibrium). Topic areas include beams, trusses, determinate frames, and load tracing.

ARCH 321 Introduction to Structures II (3) Strength of Materials; the study of the properties of materials and cross-sectional shapes of structural elements with respect to their effectiveness in resisting stresses. Topic areas include stress and strain, section properties, analysis and design of beams and columns. Prerequisite: ARCH 320.

ARCH 322 Introduction to Structures III (3) Elementary Structural Design; synthesis of the previous structures coursework with applications to design of determinate timber and steel structures. Examination of forces on buildings; snow, live loads, wind, and earthquake. An introduction to concept of continuity. Prerequisite: ARCH 321.

ARCH 331 Environmental Control Systems (3) *NW Heerwagen, Loveland* Description of thermal comfort needs and the means by which buildings can be designed to satisfy those needs. Consideration of how climate determines building forms, site analysis and planning *vis-a-vis* the local climate, basic heat transfer mechanisms, and design strategies for overcoming heat loss through the building envelope.

ARCH 332 Construction Materials and Assemblies I (3) Lectures and readings pertaining to a survey of residential and light-commercial construction materials, assemblies, and techniques of assembly.

ARCH 350 Architecture of the Ancient World (3) *VLPA* Architectural history in the Western world from beginnings to AD 550.

ARCH 351 Romanesque, Gothic, and Renaissance Architecture (3) *VLPA* Architectural history in the Western world from AD 550 to 1750. Recommended: ARCH 350.

ARCH 352 History of Modern Architecture (3) *VLPA Ochsner* Architectural history in the Western world from 1750 to the present. Recommended: ARCH 351.

ARCH 360 Introduction to Architectural Theory (3) *I&S/VLPA* Function of architectural theory in comprehending and ordering various human purposes in architecture, types of architectural purpose, and types of theories. Current concerns.

ARCH 380 Computers in Architecture (3) Laboratories, lecture, and demonstrations to introduce computing in environmental design and planning. Offered: ASP.

ARCH 400 Architectural Design IV (6) Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 302.

ARCH 401 Architectural Design V (6) Offers studio problems in non-residential building design to advance student's understanding of the ideas and technologies of architecture. Prerequisite: ARCH 400.

ARCH 402 Design/Build Studio (6) Study of the design/build process with emphasis on the synthesis of design and construction considerations. Focuses on developing design and construction concepts to meet program requirements specified in case studies. Offered: jointly with CM 402; W.

ARCH 403 Architectural Problems (6) .

ARCH 410 Introduction to Architectural Photography (3/5) *VLPA Stamets* Basic elements and processes of architectural photography to include camera controls, exposure technique, photo processing, and fundamental principles of photographing architecture. Student must provide own 35 mm (or larger) camera with manual operating controls. Offered: AWS.

ARCH 412 Architectural Illustration and Presentation (3) Issues, conventions, and techniques used in architectural renderings, including line drawings, shaded drawings, use of color, composition, organization, advanced perspective, scale figures, entourage, reflections, and media. Prerequisite: ARCH 315.

ARCH 413 Architectural Photography Projects (3) Students develop in-depth photo essays relating to architecture, the urban movement, or landscape design following the principles introduced in ARCH 313. Lectures, seminar, and discussion. Prerequisite: ARCH 313.

ARCH 415 Architectural Sketching (3) Exercises in freehand representational drawing

using charcoal, graphite, and conte crayon with emphasis on line, proportion, values, and composition. Studies progress from geometric to nongeometric forms. Recommended: either ARCH 210 or ART 104.

ARCH 416 Freehand Drawing and the Digital Realm (3) *VLPA Stevens* Explores the potential role of freehand drawing in digital media. Students use stylus and tablet to draw in print and photo-imaging programs, combining the flexibility of digital tools with the rich traditions of freehand drawing. Focus alternates between Internet as context for image making and printed output. Offered: AW.

ARCH 417 Advanced Topics in Digital Drawing (3) *VLPA Stevens* Provides a context for developing an individual project exploring drawing or painting in digital media. Explores advanced issues in digital image creation and production through a book, film, or Web project. Each student completes and publishes a project during the quarter. Prerequisite: ARCH 416. Offered: Sp.

ARCH 418 Watercolor Drawing (3) Introduction to the principles and practice of using transparent watercolor for the naturalistic representation of objects, people, and interior and exterior space. Recommended: either ARCH 210 or ART 104.

ARCH 420 Structural Design I (4) *NW* Reinforced concrete fundamentals; establishes basics of reinforced concrete behavior and introduces methods of design used in current engineering practice. Basic mechanics of structural concrete introduced in examining bending, shear, and axial forces. Topic areas include beams, slabs systems, columns, foundations, retaining walls, and an introduction to prestressed concrete. Prerequisite: ARCH 322.

ARCH 421 Structural Design II (4) Design of steel structures.

ARCH 422 Structural Design III (4) Design of reinforced concrete structures.

ARCH 426 Structural Unit Masonry (3) *Lebert* Structural behavior and design of reinforced brick, tile, and unit masonry structures. Prerequisite: CEE 381. Offered: jointly with CEE 455.

ARCH 430 Materials and Processes (3) *Vanags* Lectures, field trips, and laboratory sessions directed toward the nature, potentials, and limitations of a variety of materials (wood, metal, plastics, inorganic cementing materials, minerals, rocks, and clay) and the processes involved with their production, fabrication, and system compatibility.

ARCH 431 Environmental Control Principles (3) *Heerwagen* Daylighting of buildings, reducing noise and enhancing sound for communication, and regulating heat transfer for occupant thermal comfort; description of passive means for environmental control, including presentation of scientific explanations and design guidelines for utilizing these means; design guidelines are intended for use in the preliminary schematic design phase. Offered: AW.

ARCH 432 Construction Materials and Assemblies II (3) Lectures and readings pertaining to a survey of materials, assemblies, and techniques of assembly of concrete and

steel frame, commercial exterior envelope, and interior partitioning building constructions systems. Prerequisite: either ARCH 400 or CM 313.

ARCH 433 Active Control Systems for Building Operation (3) NW Heerwagen Electrical, mechanical (HVAC), plumbing, and fire safety systems for buildings. Descriptions of what these systems do, where they are used, how they are integrated into the overall building design; rules of thumb, design strategies, and short cuts for anticipating system design and use. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 434 Color and Light (3) Lectures, demonstrations, exercises, and projects focusing on the use of color applied to the three-dimensional architectural context. Color theory is explored with the multiple effects of changing light.

ARCH 435 Principles and Practices of Environmental Lighting (3) Millet Perception-based approach to principles of natural and artificial lighting. Practical considerations of lighting involving environmental evaluations, calculations and the use of lamps and fixtures. Sketch and model studies for applications. Impact of lighting design on energy conservation. Relation of lighting design process to architectural design concepts. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 436 Building Acoustics (3) NW Heerwagen Description of principles and practices for manipulating and enhancing sound in buildings. Information about sound behavior and the organization of architectural elements (deployment of design features, including various geometries and materials) for the control of sound in enclosed spaces and between adjacent spaces.

ARCH 437 Passive Thermal Controls (3) NW Heerwagen Devices for achieving energy-efficient buildings, analytic methods for evaluating likely thermal performances of buildings and building envelopes, resistance and capacitance of building materials, air flow through and around buildings, energy codes and industry standards, and strategies for integrating analytic techniques and guidelines into the architectural design process. Prerequisite: either ARCH 331 or ARCH 431.

ARCH 439 Light Frame Building Assemblies (3) Vanags Fundamentals of light-frame construction from soils examination, foundation systems to framing systems, and the integration of electrical, plumbing, and heating/cooling into the structure. Prerequisite: either ARCH 332 or CM 313.

ARCH 442 Africa and Middle East Seminar (3) VLPA McLaren Advanced introduction to colonial and postcolonial architecture in Africa and the Middle East, beginning with the initial European colonization in the mid-19th century. Provides a historical understanding of the formation of distinctive regional and/or national identities in the architecture of these regions. Offered: Sp.

ARCH 443 Iberoamerican Architecture I: Meso-America (3) VLPA Advanced introduction to precolombian, colonial, and postcolonial architecture and urbanism of Mexico and Meso-America. Using methodologies drawn from culture studies, covers approximately four distinct periods spanning from Teotihuacan to the late twentieth century.

ARCH 444 Iberoamerican Architecture II (3) VLPA Advanced introduction to postcolonial and modern architecture and urbanism of the Iberian peninsula and Latin America. Using methodologies drawn from culture studies, covers the cultures of Spain, Portugal, and Latin America after the period of colonialization and the nature of their continued relationship.

ARCH 445 South Asian Architecture I (3) VLPA Prakash Advanced introduction to precolonial architecture and urbanism of South Asia. Using methodologies of culture studies, examines select Hindu, Buddhist, and Islamic case studies on a comparative genealogy.

ARCH 446 South Asian Architecture II (3) VLPA Prakash Advanced introduction to colonial and postcolonial architecture and urbanism of South Asia. Using methodologies of culture studies, covers 1800 to present, emphasizing the past 50 years since India's independence in 1947.

ARCH 447 Universal Design (3) I&S Addresses implications of recent social trends and legislation (e.g., American with Disabilities Act, extended lifespan, elimination of mandatory retirement, changing workforce) on design; emphasizes importance of integrating accessibility design concepts, including related laws and codes, into diverse design projects, in order to make environment usable by broad cross-section of people. Offered: A.

ARCH 450 Modern Architecture and the Decorative Arts (3) VLPA Anderson History/theory seminar investigates parallel and interactive developments in European architecture and the decorative arts from 1870 to 1930. Examines the production of designers as well as the economic, political, and cultural circumstances that affected their work.

ARCH 451 Traditional Chinese Architecture and Gardens (3) I&S/VLPA Introduction to Chinese architecture (palaces, homes, temples, tombs), urban planning, and gardens; each area examined in terms of techniques of production, visual styles, historical development, and relationship to traditional Chinese cultural values. Recommended: some background in Chinese art, history, language, or literature.

ARCH 452 History of Architecture in Seattle and Environs (3) I&S Ochsner Historical development of architectural in Seattle and surrounding areas from the nineteenth century to the present, also touching on issues of urban design and historic preservation.

ARCH 453 Japanese Architecture (3) VLPA Survey of Japanese architecture from its origins to modern times. Although Shinto architecture, tea houses, gardens, and modern developments are discussed, the primary focus is on the development of Japanese Buddhist architecture. Offered: jointly with ART H 419.

ARCH 454 Greek Architecture (3) VLPA Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ART H 446/CL AR 446.

ARCH 455 Special Studies in Gothic Art and Architecture (3) VLPA Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and

England. Offered: jointly with ART H 455.

ARCH 456 Nineteenth-Century Architecture (3) VLPA Clausen From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Offered: jointly with ART H 490.

ARCH 457 Twentieth-Century Architecture (3) VLPA Clausen Architecture in the twentieth century, mainly in Europe and the United States. Traces roots of Modernism in Europe in the 1920s, its demise (largely in the United States) in the 1960s and recent trends such as Post-Modernism and Deconstructivism. Offered: jointly with ART H 491.

ARCH 459 Architecture Since 1945 (3) VLPA Clausen Theories and forms in architecture from the end of World War II to present. Includes new wave Japanese architects, recent Native-American developments, and non-Western as well as Western trends. Offered: jointly with ART H 493.

ARCH 460 Design Theory and Analysis (3) I&S/VLPA Dee, Seligmann Problematical nature of philosophies of architecture; interaction of philosophical concepts and architectural form and expression. Fundamentals of architectural criticism.

ARCH 461 Recent Developments in Architectural Theory (3) I&S/VLPA Concentrates particularly on developments that spring from recent work in the epistemology of science and in philosophy.

ARCH 462 Spatial Composition in Architecture (3) Advanced introduction to compositional strategies in architecture. Drawing on a historical survey of the development of Western Architecture, the seminar investigates different compositional strategies and their relationship to cultural values and systems of meaning. Intended as complement to the design studio.

ARCH 463 Theories of Representation (3) Anderson Seminar focusing on the development of representational techniques in western architecture from antiquity to the present which seeks to discover how these techniques have affected the realization and interpretation of architecture. Prerequisite: ARCH 350; ARCH 351; ARCH 352.

ARCH 475 Residential Architectural Practice (3) Lectures and exercises focused on the operation of a professional architectural practice specializing in residential and smaller-scale projects. Topics include: clients and program development, design strategies and space planning, site considerations, regulatory constraints, consultants, contractors, specialized construction methodology, and issues, ethics, and liability specific to residential project delivery.

ARCH 476 Design and the Uniform Building Code (3) Lectures, case studies, and exercises to provide a detailed review of non-structural sections of the Uniform Building Code (UBC) including designer responsibility, code background, purpose, and requirements based on occupancy, construction type, and building design features. Prerequisite: either ARCH 302 or CM 313.

ARCH 478 CAD and Working Drawings (4)

Intensive introduction to computer-aided design systems for developing construction documentation (working drawings). Lectures and exercises focus on learning the methodology for using CAD to efficiently prepare working drawings, as well as discussions regarding industry recognized standards and current technology used in the preparation of documentation. Prerequisite: ARCH 380; CM 313. Offered: ASpS.

ARCH 481 3D Modeling and Rendering (3)

Johnson Lectures and weekly exercises focus on understanding and applying the underlying principles of 3D computer graphics and rendering software. Topics include user-interface, data creation and modeling, lighting models, smoothing, texture mapping, ray tracing, radiosity, animation, and solid modeling. Prerequisite: ARCH 380. Offered: ASp.

ARCH 482 Web Weaving (3) *Gross, B. Johnson*

Examines the function, limitations, and uses of primary World Wide Web technologies and fundamental Web site design and implementation. Participants develop hands-on design/build expertise for Web site design, implementation, and maintenance using readily available tools and techniques. Looks beyond today and explores emerging Internet technologies. Offered: A.

ARCH 483 Design of Virtual Environments (3)

Explores through a blend of technical exercises constructing computational artifacts, readings, and discussions of relevant literature, the possibilities of online virtual environments. Incorporates a term project or paper based on exercises and readings. Offered: W.

ARCH 484 Design Computing Seminar (3)

Weekly colloquium and discussion forum. Discusses design computing research and report on ongoing project progress, with demonstrations and guest speakers. Explores design computing, design thinking and design process, and inventing new computer aided tools for design. Offered: W.

ARCH 485 Digital Craft Workshop: Advanced Projects in CAD (3) Advanced topics for students who have completed one or more design computing courses and wish to develop a project further. Offered: W.

ARCH 486 Computer Graphics Programming for Design (3)

Introduction to fundamental concepts of computer programming for design applications with an emphasis on interactive graphics. Basic control and data structures for interactive graphics programming; weekly exercises with term project. Significant lab time required. Offered: ASp.

ARCH 488 American Architecture (3) VLPA

Clausen American architecture from indigenous native American traditions to the present. Offered: jointly with ART H 488.

ARCH 493 Rome Preparation Seminar (2)

Seminar dealing with history, culture, topography, and customs of Rome, Italy. Required for students enrolling in ARCH 495, ARCH 496, or ARCH 497.

ARCH 495 Architectural Studies Abroad (9)

Urban history and development of the city of Rome through first-hand studies of its topography and morphology. City's more recent quarters become subject of group research relative to problems and potentials of growth and future

development. Students may be registered concurrently in an appropriate studio section. Prerequisite: ARCH 493.

ARCH 496 Architectural Studies Abroad (9)

Studio-oriented projects and application of experience gained during preceding program. Seminars held in collaboration with Italian students, professionals, and educators. Prerequisite: ARCH 495.

ARCH 497 Italian Hilltowns (9) I&S/VLPA

Introduction to origins and development of built forms prevalent in the hilltowns of central Italy, a comparative analysis of domestic architecture in the agricultural context of the confluence zone of Tuscany, Umbria, and Latium and a historical survey of fortresses, castles, palaces, villas, and gardens of upper Latium. Prerequisite: ARCH 493.

ARCH 498 Special Projects (1-12, max. 12)

Instructor-initiated and department-approved systematic study and offering of specialized subject matter. Topics vary and are announced in preceding quarter.

ARCH 499 Undergraduate Research (1-6, max. 6) .**ARCH 500 Architectural Design Studio I(6)**

Architectural design, with emphasis on development of professional skills in design synthesis; specifically the design of institutional buildings in response to a context that is significant for historical and urban characteristics. Analysis includes programming, typology, site and place, and influence of regulatory measures on building form. Concurrent with ARCH 590. Offered: A.

ARCH 501 Architectural Design Studio II(6)

Architectural design, with emphasis on development of professional skills in design synthesis, specifically, the unique qualities of materials, construction technology, and assembly details in the expression of architectural ideas. Analysis includes the influence of regulatory measures on building form. Concurrent with ARCH 570. Offered: W.

ARCH 502 Architectural Design Studio III (6)

Architectural design, with emphasis on development of professional skills in design synthesis, specifically the comprehensive integration of building systems within an ordered design concept. Analysis includes the planning and integration of structural systems, building service systems, and building envelope design as an appropriate architectural expression. Concurrent with ARCH 530. Offered: Sp.

ARCH 503 Architectural Design Studio Options (6)

Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 504 Architectural Design Studio Options (6)

Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants, and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 505 Architectural Design Studio Options (6)

Advanced architectural studios in general architectural design, in special projects examining particular architectural determinants,

and in architectural research. Focus and format vary with instructor. Prerequisite: ARCH 502.

ARCH 506 Advanced Architectural Studies (6)

Advanced experimental studies dealing with significant architectural relationships that involve scholarly investigation, development, and presentation of results.

ARCH 520 Advanced Wood Structures Design (3)

Design methods related to wood structures. Nature of wood as a building material, plywood, glued laminated wood structures, timber piles and pile foundations, pole buildings, and conventional wood building framing.

ARCH 529 Seminar in American Architecture (5)

Clausen Topics vary. Offered: jointly with ART H 592.

ARCH 530 Integrated Building Systems (3)

Miller Discusses strategies for ordering separate and discreet building systems into integrated architectural schemes. Focuses on systems that affect architectural expression and resolution in buildings including: structural, environmental control, materials, and assembly with an emphasis on sustainable building design. Concurrent with ARCH 502. Offered: SP.

ARCH 535 Graduate Seminar: Study Topics in Environmental Lighting (3)

Focus on individual student projects involving research and design for lighting.

ARCH 540 Evolution and Aesthetics (3)

Exploration of new views toward the theory and philosophy of architectural aesthetics in which responses are seen as driven, in part, by predilections contributive to biological survival and evolution.

ARCH 551 Scandinavian Architecture of the Nineteenth and Twentieth Centuries (3)

Introduction to the contribution of Scandinavian architecture to early functionalism with emphasis on its relationship to neoclassicism and vernacular architecture.

ARCH 553 Special Studies in Architecture in the Ancient World (3) Study and critical analysis of a selected topic from classical or preclassical periods. Prerequisite: ARCH 350.

ARCH 554 Special Studies in Modern Architecture (3)

Study and critical analysis of a selected number of distinguished professionals (architects, planners, educators, critics) and their contributions to the evolution of modern and contemporary architectural practice and thought.

ARCH 556 The Arts & Crafts Movement and American Architecture (3)

Ochsner Historical development of the arts and crafts movement focusing primarily on its influence on American architecture from 1870 to the present.

ARCH 557 Neoclassicism and Romanticism in Europe and America (3)

Study and critical investigation of European and American architecture and urban design from 1750 to 1850.

ARCH 558 Seminar in Twentieth-Century Architecture (3/5)

Clausen Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in architecture, architectural history, or permission of instructor. Offered: jointly with ART H 591.

ARCH 559 American Utilitarian Architecture (3) Significant American environmental design efforts arising from utilitarian needs, e.g., factories, bridges, skyscrapers, and associated technical building innovations.

ARCH 560 Graduate Seminar on Architectural Theories (3) *Dee, Seligmann* Recent developments in architectural theory, urban design theory, criticism, and the methodology of criticism.

ARCH 561 Urban Design Theory (3) Study of development of nineteenth- and twentieth-century urban design theories and parallel developments in architecture and urban planning. Theoretical premises are related to current practices of urban design in various sociopolitical contexts, European as well as American. Evolutionary nature of theory emphasized. Prerequisite: URBDP 479 or permission of instructor.

ARCH 562 Regionalism (3) Exploration of design ideas that address the cultivation of regional character by acknowledging the commonplace, including both the landscape and its buildings. The many disruptive forces that threaten the possibilities of local culture are also considered from a political, social, and economic point of view.

ARCH 563 Graduate Seminar in Architecture and Cultural Theory (3) Study of contemporary cultural studies and postcolonial writings in terms of their impact on architectural theory and practice. Topical seminar based on reading and individual research. Offered: W.

ARCH 570 Design Development (3) *Miller* Lectures and case studies emphasizing the design development phase of architectural practice.

ARCH 571 Project Feasibility (3) Social, political, and economic factors affecting the location, design, financing, construction, and marketing of buildings.

ARCH 572 Specifications and Contracts (3) Detailed organization and composition of contracts, specifications, and related contract documents.

ARCH 573 Professional Practice (3) *Rees* Operation of an architectural office and professional practice.

ARCH 574 Design and Construction Law (3) Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with CM 500.

ARCH 576 Community Leadership Practices (4) *Sutton* Examines how to facilitate community design processes. Explores theories and methods of participation and applies them to creating community visioning tools. These tools are put to use during the spring charrette when city officials, neighborhood residents, K-12 students, and others create a shared vision for their community. Offered: W.

ARCH 577 Ethical Practice (3) *Sutton* Helps students develop ethical reasoning skills. Examines the sociology of professional practice

leading to and understanding of the dilemmas associated with serving a diverse society. Reviews exemplary case studies in ethical practice. Communication skills developed through writing and dialogue, and creation of an exhibit exploring an ethical issue. Offered: W.

ARCH 578 Case Studies in Contemporary Architectural Practice (3) Presentations and discussions by local architectural firms examining the issues that influence building design and project delivery in contemporary architectural practice. Focuses on understanding the issues as opportunities rather than impediments to good design. Class visits a different architectural firm each week for an in-depth review of current projects.

ARCH 581 Historic Preservation of Architecture, USA (3) American achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

ARCH 582 Technical Issues in Preservation Design (3) Issues, practices, and procedures involved in preservation and reuse of old and historic buildings. Technical and esthetic means by which practicing professionals approach the analysis, interpretation, and resolution of problems such work raises. Emphasis on recent and local projects and related experiences.

ARCH 583 History of Historic Preservation in Europe (3) European achievements in historic preservation and restoration of architecture. Prerequisite: specialization in preservation design or permission of instructor.

ARCH 587 Theory of Design Computing (3) Examines the relationship between theory of design and computational tools for practice. Explores how the emergence of computers as a mainstream tool in design has already changed architectural practice. Discusses how, as with other technologies that revolutionized the practice of architecture, information technologies carry hidden implications about design process and products. Offered: A.

ARCH 588 Research Practice (3) Provides the opportunity for a guided preliminary exploration and refinement of a research topic, prior to thesis proposal. Weekly seminar meetings focus on student work with regular presentations and discussions. Offered: W.

ARCH 590 Urban and Preservation Issues in Design (3) Introduction to recent theory and practice in the fields of urban design and historic preservation primarily in North American urban contexts, including examples of recent projects presented by practicing professionals.

ARCH 591 Architecture in the Landscape (3) Advanced introduction to the relationships between buildings and places in the landscape with an emphasis on western concepts of nature. A taxonomy of place as nature is developed. Ways in which the architect can design places that landscape taxonomy are explored.

ARCH 593 Residential Design: Methods and Practices (3) Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods, and practices. Offered: jointly with URBDP 574.

ARCH 595 Master's Thesis Studio and Pre-Design (3) Preparation of master's design thesis pre-design document within a structured, faculty supervised setting. Student product covers programming; site analysis; land use, building, and accessibility code compliance; building systems selection (material, structural, and mechanical); cost implications; conceptual approach and schematic design exploration. Required for admission to the master's thesis design studio. Offered: AW.

ARCH 596 Fieldwork in Professional Practice (*, max. 9) On-location study under the supervision of a practicing professional involved in an aspect of environmental design.

ARCH 598 Special Topics for Graduate Students (1-6, max. 6) Systematic study and offering of specialized subject matter. Topics vary and are announced in the preceding quarter. May be repeated for credit.

ARCH 599 Thesis Preparation (3) Explores development of a proposal for thesis-level research. Participants identify a research area, find relevant literature and prepare an annotated bibliography, articulate a specific question within the research area, and write, present, and defend a proposal. Participants may use this course to develop a thesis proposal. Offered: Sp.

ARCH 600 Independent Study or Research (*) Credit/no credit only.

ARCH 700 Master's Thesis (*) Credit/no credit only.

Built Environment

B E 550 Colloquium-Practicum on Research-Practice and Teaching-Learning (1, max. 6) A synthetic and interdisciplinary forum for the presentation and peer critique of faculty and student research and practice projects, and a venue for pedagogical issues and skills for effective teaching and learning.

B E 551 The Contemporary Built Environment (3) Covers major or landmark cases of complex built environment projects, emphasizing the multiple dimensions involved and their interconnections.

B E 552 Theories of Knowledge and the Built Environment (3) Systematic examination of alternative epistemological frameworks applicable to studying the built environment; examinations of their differences and similarities and of the possibility of a comprehensive, pluralistic approach.

B E 553 Ethics in Practice, Research, and Teaching (3) Preparation for ethical challenges facing professional practice, research, and teaching in the built environment. Coverage of general and professional ethics, and examination of principles and rules and application through case studies.

B E 598 Special Topics (1-6, max. 15) Systematic study of specialized subject matter. Topics vary depending on current interest and needs, and are announced in the preceding quarter.

B E 800 Doctoral Dissertation (*, max. 30) Credit/no credit only. Offered: AWSpS.

College of Architecture and Urban Planning

CAUP 496 Practical Experience (3-6, max. 6)
Credit/no credit only.

CAUP 498 Special Projects (1-12, max. 12)

Community and Environmental Planning

CEP 200 Introduction to Community and Environmental Planning (5) I&S *Purcell*
Introduction to central themes of major. Opportunities to engage in community action and planning process, while developing ecological literacy. Lectures, discussions, and critical writing exercises combine to increase knowledge and interest in these fields. Emphasis on developing community of learners in and out of classroom setting. Offered: A/SpS.

CEP 220 Field Studies in Community and Environmental Planning (5) I&S/VLPA *Ryan*
Field studies building on theories and practices introduced in CEP 120. Emphasis on collaborative practice of research and design in public realm with complex and often conflicting objectives, positions, and meanings. Regional inquiry of cultural landscape and design. Tools for understanding place and shaping future change. Offered: A.

CEP 301 The Idea of Community (5) I&S
Theories of community and communal rights and responsibilities. Experience building a learning community within major. Explores struggles for community in every sector of life. Witness essentials of community through service and field experiences, students construct individual curriculum and learning plans for major, selecting cross-disciplinary work. Credit/no credit only. Offered: A.

CEP 302 Environmental Response (5) I&S/NW
Explores issues of environmental crisis and societal responses. Readings and reflective analysis from broad selection of authoritative sources to develop grounded perspective in ecological literacy and consciousness. Concurrently, experiential education in challenges and practical responses to building sustainable society through participation in community-based environmental effort. Credit/no credit only. Offered: W.

CEP 303 Social Structures and Processes (5) I&S
Investigates use of formal and informal social structures and processes within context of community and environment. Looks culturally at patterns and institutions of social organization and relationships among different sectors. Issues of interrelatedness, citizenship, knowledge, and communication. Participation in local community service organization. Credit/no credit only. Offered: Sp.

CEP 446 Internship (5, max. 10)
Connects core and individual courses with field work. Group and individual readings develop understanding of how students' internships and field placements constitute particular element of community and environmental planning. Explores how what we do for a living is part of our lives as citizens and public service. Credit/no credit only. Offered: AWSp.

CEP 460 Planning in Context (5) I&S
Examines theory against backdrop of practice for broad,

historical understanding of social, political, environmental planning. Critique from viewpoints, e.g., planning history, ethics, ecofeminism, environmental justice, class and capitalism, planning and global economy. Develop personalized history reflecting individual experience, professional experience, and philosophical heritage of planning profession. Credit/no credit only. Offered: A.

CEP 461 Ethics and Identity (5) I&S
Examination of personal, societal, vocational, environmental, planning ethics. Readings and discourse on ethical foundations for public life. Individual and group readings on values, human potential. Develops understanding of ecological context, moral responsibility, self-awareness. Constructs positive, diverse view of humanity, environment regardless of race, gender, ethnicity, beliefs. Credit/no credit only. Offered: W.

CEP 462 Community and Environment (5) I&S
Capstone quarter merges core seminars, disciplinary courses in major, community field experiences for mastery of personal knowledge and skills. Reflection and synthesis of themes in major; engagement with contemporary issues. Compares theoretical definitions of community and environment with individual philosophies and knowledge within thoughtful, applied context. Credit/no credit only. Offered: Sp.

CEP 479 Planning and Development in the Puget Sound Region (3-12, max. 12) I&S *Coffey, Dierwechter, Ryan*
A field-based course focusing on the Seattle-Tacoma urban region. Examines the problems and prospects associated with rapid growth through site visits and discussions with public officials, planners, and developers. Topics/sites vary and include such issues as growth management, sprawl, transportation, sustainable development, land use, and environmental protection. Offered: jointly with T URB 479;AWSPS.

CEP 498 Special Topics (1-9, max. 15) I&S
Systematic study of specialized subject matter.

CEP 499 Undergraduate Independent Study or Research (1-5, max. 10)
Individual reading, research, fieldwork, other special project approved and supervised by faculty adviser most appropriate for the project proposed. Report on the purposes, procedures, and results of study is required. Credit/no credit only. Offered: AWSpS.

Construction Management

CM 250 Construction and Culture (3) I&S *Rolfe*
Study of the evolution of modern building construction with emphasis on the relationship between the projects that have been built over time and the people who built them. Focuses on the development of building technology, equipment, and materials used by Western civilizations. Offered: Sp.

CM 310 Introduction to the Construction Industry (3) *Schaufelberger*
Introduction to the construction process, including general overview of organization, relationships, practices, terminology, project types, procurement methods, industry standards, contract documents, and career opportunities. Offered: A.

CM 311 Construction Documents (2)
Introduction to construction plans and specifications with emphasis on reading and interpreting them. Focuses on architectural/engineering drawings and associated specifications used in

building construction. Prerequisite: CM 310; CM 313, which may be taken concurrently. Offered: A.

CM 312 Construction Accounting (3) *Goldblatt*
Introduction to accounting for the contractor, placing emphasis on the analysis and use of financial statements and a job cost accounting system. Open to nonmajors on space-available basis. Offered: A.

CM 313 Construction Methods and Materials I (4)
Introduction to basic building materials, with emphasis on techniques for assembly and utilization in residential and light construction, including materials such as concrete, brick, and wood. Offered: AS.

CM 320 Construction Contract Documents (3)
Introduction to working drawings, specifications, and other documents designed to enable the student to read and interpret complete set of contract documents for residential and light commercial projects. Emphasis on the organization and uses of architectural/engineering drawings and specifications in the construction process. Offered: WS.

CM 321 Mechanical Systems in Buildings (3)
Introduction to building heating, cooling, plumbing, and fire protection systems including aspects of design, construction, estimating, and problem solving. Offered: W.

CM 322 Electrical Systems in Buildings (3)
Introduction to electrical construction including electrical distribution from generation to consumption, terminology, equipment and applications, electrical contract documents and estimating, and electrical project management theory and practice. Offered: W.

CM 323 Construction Methods and Materials II (5)
Analysis of building methods for structural, non-structural, and design and use of temporary structures including method selection, sequencing, and coordination of specialty trades in commercial and industrial construction. Offered: W.

CM 331 Construction Estimating I (4) *Abdel-Aziz*
Introduction to the principles and techniques of estimating construction costs, with emphasis on quantity take-off and pricing elements of work. Offered: Sp.

CM 332 Construction Equipment Management (3) *Schaufelberger*
Study of the basic principles, practices, and techniques used in the construction industry for selecting and managing construction equipment. Focuses on understanding the time value of money, estimating equipment ownership and operating costs, selecting the proper equipment for specific construction tasks, and estimating equipment production. Offered: Sp.

CM 333 Construction Safety (3)
Explanation of requirements of the Occupational Safety and Health Act and other related federal and state legislation as applied to the building construction industry. Standards for accident prevention, hazard identification, and responsibility for compliance emphasized. Offered: A.

CM 334 Construction Surveying (2) *Jacobson*
Introduction to construction surveying including layout of construction features, distance and elevation measurement, and use and care of surveying equipment. Offered: Sp.

CM 350 History of Building (3) *Rolfe* Historical survey of building techniques and materials as conditioned by environment, technical, economic, and social influences. Open to nonmajors. Offered: Sp.

CM 402 Design/Build Studio (6) Study of the design/build process with emphasis on the synthesis of design and construction considerations. Focuses on developing design and construction concepts to meet program requirements specified in case studies. Offered: jointly with ARCH 402; W.

CM 410 Construction Estimating II (5) *Rojas* Principles and techniques for estimating commercial construction projects including a mock bid day exercise on a commercial construction project. Offered: A.

CM 411 Project Planning and Control (3) *Pace* Introduction to the basic principles, techniques, and practices used as tools by contractors to plan, schedule, and control costs on building construction projects. Offered: A.

CM 412 Construction Practice (3) *Rojas* Introduction to challenges of managing a construction organization. Focuses on ethical behavior, organizational behavior, human resources management, marketing, financial management, and risk management. Offered: Sp.

CM 413 Competitive Business Presentations (1) *Schaufelberger* Study and development of skills needed to develop and deliver professional construction management presentations. Includes a series of workshops and practical exercises in construction presentation skills, teamwork, and leadership. Offered: A.

CM 415 Heavy Construction Practices (3) *Schaufelberger* Introduction to heavy construction with emphasis on highway and bridge construction. Topics include: contract analysis, work breakdown, equipment selection, unit-price cost estimating, site logistics planning, and project scheduling. Offered: A.

CM 420 Temporary Structures (3) *Nemati* Study of temporary structures used to support construction operations such as concrete formwork, scaffolding systems, shoring systems, cofferdams, underpinning, slurry walls, and construction dewatering systems. Offered: Sp.

CM 421 Project Management I (3) Introduction to the organization, management, and administrative functions on construction projects including a hands-on and extensive case study of a commercial construction project, cost control, and introduction to the concepts of Value Engineering, partnering, and Total Quality Management. Offered: W.

CM 422 Computer Applications in Construction (2) Introduction to the use of automated programs for planning, scheduling, and controlling construction projects. Focuses on the use of Primavera Project Planner software. Offered: A.

CM 423 Construction Law (3) *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Washington state law is emphasized. Entry code

required. Open to nonmajors on space-available basis. Offered: Sp.

CM 425 Concrete Technology (3) *Nemati* Introduction to the properties and behavior of concrete. Focuses on uses of concrete as a building material and new techniques for concrete construction. Offered: W.

CM 431 Project Management II (5) Capstone project using case studies to apply skills, knowledge, techniques, and concepts developed in prior courses. Emphasis on the concept of integrated project management, including cost estimating and bidding, scheduling, cost control, safety, project organization, and documentation. Offered: Sp.

CM 432 Soils and Foundations (3) *Daniali* Origin, classification, and physical properties of soil as used in engineering and construction applications, together with loads and stresses of soil on, and from, the more common types of engineering structures. Offered: AS.

CM 433 Construction Labor Relations (3) *Goldblatt* Introduction to construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Offered: W.

CM 454 Real Estate Finance (4) *Rolfe* Introduction to financing and appraisal of real estate projects, including a survey of capital markets, banking regulations, interest/discounting theories, debt instruments, and project financing. Offered: W.

CM 455 Real Estate Development (5) *Rolfe* Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Offered: A.

CM 456 Real Estate Investments (5) *Rolfe* Analysis of private and public real estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in 453, 454, and 455. Prerequisite: either CM 454 or CM 455. Offered: Sp.

CM 481 Facility Life Cycle 1: Planning (3) Introduction to facility management. First in sequence of three built around the principle of the facility life cycle. Defines key terms. Examines topics such as ethics, business context, budgets, cost analysis, and strategic planning. Students work in online teams to develop a course-final project.

CM 482 Facility Life Cycle 2: Design and Construction (5) Second in sequence of three built around the principle of the facility life cycle. Covers design basics, cost estimates, building materials, project management, and construction administration. Students establish a mentor relationship with a professional facility manager and interview three guest speakers, experts in their fields.

CM 483 Facility Life Cycle 3: Relocation and Operational Issues (4) Final in sequence of three built around the principle of the facility life cycle. Provides an overview of issues related to facility operations and maintenance, including occupancy and start up, inventory and staff management, relocation, disaster planning, emergency preparedness, and security.

CM 485 Facility Management Studio (6) Applies skills learned through the three facility life cycle courses to the completion of a project that demonstrates the ability to identify and resolve facility management issues. Students are matched with a client in their region.

CM 498 Special Topics (1-10, max. 20) .

CM 499 Undergraduate Research (*, max. 12) Individual or small-group studies in which students may select topics with approval of faculty sponsor and department.

CM 500 Design and Construction Law (3) *Goldblatt* Legal issues arising from design and construction services, focusing on risk management and liability awareness. Topical areas include basic legal doctrines, the design professional/client relationship, contractor selection, the construction process, and professional practice problems. Emphasis on Washington state law. Offered: jointly with ARCH 574. Offered: Sp.

CM 505 Advanced Integrated Computer Applications (3) *Rojas* Study of management information systems used in the construction industry. Emphasis on the utilization of current state-of-the-art integration of Computer Aided Design (CAD), scheduling (including advanced concepts such as resource leveling, schedule compression, and cash flow projections), and estimating programs. Offered: S.

CM 510 Advanced Construction Techniques (3) *Nemati* Study of techniques and practices used in complex construction projects, including industrial and high-rise structures, building renovation, and tenant improvements. Offered: A.

CM 515 Innovative Project Management Concepts (3) *Abdel-Aziz* Study of the process for delivery of public-private infrastructure projects and risk analysis techniques used in economic/financial project studies. Focuses on understanding public-private project delivery systems, feasibility studies, project financial and economic modeling, and quantitative risk analysis techniques. Offered: W.

CM 520 Construction Procurement Systems (3) *Schaufelberger* Study of the different methods used in the procurement and delivery of projects in the construction industry including lump sum, unit price, cost-plus, design-build, and construction management contracts. Offered: A.

CM 525 Cost Analysis and Management (3) *Pace* Study of cost management procedures applicable to the building process from the conceptual phase through owner operations, including conceptual estimating, project cost analysis and control, and value engineering and life-cycle costing. Offered: W.

CM 545 Real Estate Development (3) *Leahy* A study of the technical issues involved in developing real-estate projects. Tracks project development from initial conception through closing of the sale. Emphasizes the steps and processes involved in pursuing, analyzing, and closing a real-estate purchase. Offered: A.

CM 550 Residential Project Development (3) *Leahy* Study of the financial, technical, and management activities and environmental impact regulations and studies associated with the development of residential projects, including business and construction practices and

marketing strategies for continued profitable operation of a residential construction firm. Offered: Sp.

CM 555 Construction Firm Management I (3)
Schaufelberger Management of construction company including organization, corporate structure, operation procedures, marketing, and human resources management. Emphasis on safety and loss prevention management, insurance and risk management, financing, accounting, marketing construction services, and bonding requirements for construction company. Other topics include individual and corporate planning and process of strategic planning. Offered: W.

CM 560 Construction Firm Management II (3)
Huppert Examination of the business practices, including market feasibility studies, related to use of Management Information Systems (MIS) in a construction company. Offered: Sp.

CM 565 Managing International Projects (3)
Schaufelberger Study of processes involved in the selection, acquisition, and management of international construction projects. Emphasis is placed on examining common problems associated with managing construction projects outside the United States, identifying risks involved, and discussing possible solutions. Offered: Sp.

CM 570 Facilities Management (3) *Emam*
Major issues involved in facilities management: facilities planning, financial planning, real estate management, interior space planning and management, facilities operation and maintenance, and emergency preparedness. Offered: A.

CM 580 Temporary Structures (3) *Nemati* Study of materials, methods, and techniques associated with temporary structures used in various construction operations, such as concrete formwork, scaffolding, underpinning, cofferdams, slurry trenches, earth-retaining structures, and dewatering systems. Offered: W.

CM 582 Heavy Construction Estimating (3)
Abdel-Aziz Study of the principles used in developing cost estimates for heavy construction projects. Includes interpretation of contact documents, quantity take-off, pricing, and preparation of unit-price bid documents. Emphasizes developing cost estimates for highway projects. Offered: S.

CM 584 Marine Construction (3) *Daniali* Study of the materials, methods and techniques associated with construction of projects in marine environments, including the impact of site conditions on the selection of appropriate construction techniques. Emphasizes equipment and crew selection, productivity and cost estimation, and construction sequencing. Offered: A.

CM 586 Utility Systems Construction (3)
Schaufelberger Study of the materials, methods, and techniques associated with construction of major utility systems, such as water, sewer, communications, electrical or natural gas. Includes construction of central utility plants as well as major distribution and collection systems. Offered: W.

CM 588 Construction Operations and Productivity (3) *Rojas* Study of heavy construction operations with emphasis on productivity enhancement focusing on an integrated approach to planning, modeling,

analysis, and design of construction operations, and the use of simulation models and other analytical tools. Offered: A.

CM 598 Special Topics (1-6, max. 6)
Systematic study and offering of specialized subject matter. Offered: AWSpS.

CM 600 Independent Study or Research (*, max. 6)
An in-depth independent investigation of some facet of construction management. Offered: AWSpS.

CM 700 Master's Thesis (*, max. 10) Offered: AWSpS.

Landscape Architecture

L ARCH 200 Landscape Architecture Field Trips (2) I&S/VLPA Five field trips introduce typical landscape architecture projects and demonstrate scope of the landscape architecture field. Visits to major projects in the Puget Sound region include city and county parks, river parks, harbors, downtown redevelopments, streetscapes, campus headquarters, and others. Open to nonmajors.

L ARCH 300 Introductory Landscape Architecture Design Studio (6) VLPA
Introduction to history and environmental influences in field while developing design and graphic skills. Site analyses and drawing to convey design concepts. Relationship of visual perception to drawing, role of values in design, verbal communication, and behavioral analysis of design process. Required for admission to Bachelor of Landscape Architecture program.

L ARCH 301 Design Foundation Studio (5)
Introduces site planning and design process, principles, and skills through experiential learning. Using design principles, studio develops vocabulary for site design. Activities foster skills in design process, form, language, creativity, communication, group dynamics, and organization. Methods include readings, discussion, design exercise and projects, critiques, precedent studies, site visits. Majors only.

L ARCH 302 Site Design in Urban Context (5)
Explores the application of design ideas and principles to urban sites. Theory and research informing the design of human environments and lessons from urban and ecological design precedents are implemented in the design of plazas, urban parks, waterfronts, streets, campuses, commercial areas, and historical sites.

L ARCH 303 Natural Processes Studio (5)
Project design studies related to natural systems. Emphasizes the innovative use of historical landscape forms to achieve more sustainable landscape performance, using both biophysical and social criteria to define sustainability. Introduces computer mapping applications.

L ARCH 310 Landscape Architecture Field Sketching (2) Introductory level sketching of landscape subjects: natural and urban sites, plants, animals, architectural elements. Emphasis on perspective. Various media, including pencil, charcoal, markers, ink wash, water color.

L ARCH 311 Introduction to Design Graphics (2) Introduction to communication techniques for various phases of the design process. Many techniques are introduced and their suitability

and appropriateness for different purposes explored.

L ARCH 322 Introduction to Planting Design (3) VLPA Traditional ways plants are used in landscape design. Composition and design characteristics of plant materials. Technical considerations for selection, climate, cultural suitability, availability, costs, and maintenance. Open to nonmajors.

L ARCH 331 Landscape Construction (4) Basic course in site engineering, correlating the design and technical aspects of site development and suitability. Grading, drainage, circulation requirements and alignment, organization concepts relative to landscape resources, site evaluation, utilization and protection, and building and site program analysis and coordination.

L ARCH 332 Landscape Construction (4)
Materials and structures in landscape construction. Design criteria and construction techniques for detail elements of landscape architecture. Working drawings, specifications, cost estimates, and procedures.

L ARCH 341 Site Planning (3) Introduces urban ecological design issues for good site planning processes, principles, and methods. Linked with L ARCH 301. Addresses planning for people, natural systems in place-making, design for movement with carried land uses. Includes readings, discussions, presentations, campus walks, case studies, graphic and written assignments.

L ARCH 352 History of Landscape Architecture (3) I&S/VLPA Survey of the development of landscape architecture as an art form from Mesopotamia to the present. Relationships to physical landscape, climate, culture, religion, and other arts. Open to nonmajors.

L ARCH 353 History of Modern Landscape Architecture (3) I&S/VLPA Development of profession and art of landscape architecture in the United States, Europe, South America, and Japan in relation to prevailing social, economic, political, and cultural factors. Relationships with other professions, especially architecture and urban planning, and other arts, such as painting and sculpture. Open to nonmajors.

L ARCH 361 The Human Experience of Place (3) I&S/VLPA Interdisciplinary approaches to exploring the reciprocal relationship between people and the landscapes of everyday life. Through readings, discussion, in-class activities and mini-projects, students study place attachment, relationships to nature, environmental attitudes and perception, personal space, territoriality, urban public space, diversity, participation, and the politics of space. Open to nonmajors.

L ARCH 362 Designing Urban Landscapes: Theory and Politics (3) VLPA Introduction to the design of landscape in urban contexts. Overview of major urban design theories and examples of historic and contemporary work. Discussion of the contesting urban processes: visions of city, social and cultural factors, public and community process, and the discourses of nature, urban ecology, and ecological design.

L ARCH 363 Ecological Design and Planning (3) NW Introduction to landscape ecological theory applied to urban environments. Comparison of different vocabularies used to describe landscape structure and function, from the fields

of landscape design, urban design, and biology. Discussion of design theories that have sought to re-center landscape planning and design around the goal of achieving ecological sustainability.

L ARCH 401 Urban Recreation Design (1-6) I&S/VLPA Special studies in metropolitan, urban, and neighborhood recreation areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

L ARCH 402 Neighborhood Design Studio (1-6, max. 6) Studio at neighborhood and site scales, mixed use. Incorporates urban design theory, precedents, neighborhood/project issues, and community clients. Skills in neighborhood and site analysis, programming, designs are developed in groups and individually. Methods include readings, research, critiques, field studies, and graphic, written and verbal presentations.

L ARCH 403 Cultural Landscape Studio (1-6, max. 6) Studies of the landscape at various scales and in diversified contexts. Offers better understanding of visual components of landscapes, designer's capacity to evaluate and change these components, and resultant interaction with, and effect on, landscape user.

L ARCH 406 Individual Design Studio (6) Senior projects in landscape architecture; projects vary according to the student's particular emphasis and needs.

L ARCH 411 Landscape Graphics (3) Introduces fundamental hand-drawn graphic conventions, drawing techniques, and media used in environmental design. Emphasizes building drawing and media skills that support design ability development. Includes lectures, demonstrations, display of examples, drawing from slides, and in-class workshops.

L ARCH 412 Landscape Communications (2) Development of advanced skills of visual representation to communicate students' visions for urban ecological design. Discussion of professional portfolio requirements and portfolio design issues.

L ARCH 423 Planting Design Studio (3) Utilization of plants as design elements to manipulate space and modify the landscape for various activities and resolutions of site problems. Factors that determine the appropriate use and arrangement of plant materials in an urban context. Composition, plant selection, planting techniques, and maintenance requirements are major components of this class.

L ARCH 424 Advanced Planting Design Seminar (2) Analyzes the complex relationship between plants, man, and environment and affords opportunity to explore methods of utilizing these relationships to plant and to design more responsive landscapes.

L ARCH 425 Advanced Planting Design Studio (1-6, max. 6) Advanced seminar/studio in planting design. Provides opportunity to explore ecological, technical, and esthetic principles for selecting plants to meet specific site conditions. Project types include historical sites, multifamily housing projects, plazas, landfills, and reclamation sites.

L ARCH 433 Large-Scale Site Construction (4) Includes studies of natural determinants and

restraints on large-scale construction, development affected by service and utility systems, physiographic suitability of site, cost-benefit analysis, and critical path methodology for site construction projects.

L ARCH 440 Computers in Landscape Architecture (1-3, max. 3) Laboratory, lecture, and demonstration classes to introduce software applications specific to required landscape architecture courses. Credit/no credit only.

L ARCH 441 CAD for Landscape Architecture (3) An introduction to computer-aided drafting for professional landscape architectural practice. Students work in a variety of scales from detail, to planting design, to master plan graphics, to gain a broad-based knowledge of current industry CAD practices and techniques. Emphasizes using CAD as an effective design tool.

L ARCH 450 History of Environmental Design in the Pacific Northwest (3) VLPA Development of landscape architecture, architecture, and urban planning in the Pacific Northwest from nineteenth century to the present, with major emphasis on twentieth century. Open to nonmajors.

L ARCH 451 History of Environmental Design on the West Coast (3) VLPA Development of the environmental arts of landscape architecture, architecture, and urban planning from the eighteenth century to the present, with major emphasis on the twentieth century. Open to nonmajors.

L ARCH 463 Urban Recreational Design (3) I&S/VLPA Special recreational studies in metropolitan, urban, and neighborhood areas; the design, policies, and behavioral studies of existing parks, playgrounds, public places, and commercial areas. Design projects dealing with the play environment for all ages. Open to nonmajors.

L ARCH 470 Landscape Architecture Tutorial (2, max. 6) Various aspects of project organization, programming, scheduling of work loads, graphic and verbal communication problems, data collection methods and interpretation, methodologies for landscape planting and design.

L ARCH 473 Professional Practice (3) Professional practice in private office, academic institutions, and public agencies. Evolution of landscape architecture as a profession, possible scenarios for future, variety of practice types and their relationships, ethical and legal/contractual responsibilities of a professional.

L ARCH 474 Project Design (1-6, max. 6) Detailed design studies of small-to-medium-scale projects. General focus on public landscape areas and social/psychological uses of site. Specific focus on design development and professional office presentation.

L ARCH 475 Advanced Project Design Studio (1-6, max. 6) .

L ARCH 476 Professional Operations (3-6, max. 6) Practicum course for landscape architecture majors for internship and exposure to the profession with working experiences at various levels of professional endeavor. Student apprenticeship in selected private offices and public agencies. Credit/no credit only.

L ARCH 477 Landscape Architecture Consultancy Studio (3-6, max. 6) Simulation of the professional relationship of the landscape architect as a consultant to University students in other design planning and management disciplines. Focus is on site analysis, master planning, schematic designs and detailed design, working drawings, and planting plans associated with student projects.

L ARCH 495 Landscape Architectural Studies Abroad (1-10, max. 30) Studies conducted under faculty supervision in various locations outside the United States.

L ARCH 498 Special Projects (1-10, max. 30) Special projects as arranged. Open to nonmajors.

L ARCH 499 Undergraduate Research (1-9, max. 9) Individual or small-group studies pertaining to special problems, theories, or issues of landscape architecture and environmental issues.

L ARCH 501 Landscape Design and Planning I (1-6) Enhances perceptual awareness and design sensitivity to natural and man-made landscapes. Basic skills necessary for more advanced course work required in the Master of Landscape Architecture degree program. Examination of landscape environment through problem-solving techniques that acknowledge holistic approach to the environment.

L ARCH 503 Landscape Design of Communities (1-6) Methods and techniques for developing physical design solutions and implementation strategies in neighborhoods and small communities. Social, economic, political, and individual forces affecting community development and growth. Comparison of several communities, identifying pertinent landscape issues, potential design solutions, and methods for achieving design goals through the political process.

L ARCH 504 Regional Landscape Planning (1-6) Application of landscape ecological theory to the design of urban environments. Focuses on the strategic design of urban infrastructure, including underground drainage systems, roads, parks, transit systems, and on understanding the cumulative performance of urban sites.

L ARCH 505 Regional Landscape Design (1-6) Theory/techniques of regional design to analyze, evaluate, plan, design, and manage the resources of the regional landscape continuum.

L ARCH 506 Landscape Visual Resources (1-6) Survey of existing theory/techniques and the generation of new methods to analyze, evaluate, plan, design, and manage the visual resources of the landscape.

L ARCH 507 Landscape Art (1-6) Public art placed in, or developed for, specific landscape settings. Various aspects and benefits of public art, including materials, technologies, philosophies of landscape imagery and meaning. General planning criteria for location for maximum public benefit and identification of objectives for a specific site and artwork.

L ARCH 511 Visual Learning (3) Seminar/laboratory to develop visual learning processes and skills for applying these processes to landscape architecture. Related visualization concepts.

L ARCH 523 Landscape Technology (1-6)

Studio on rehabilitation of stressed urban landscapes. Focus varies but often deals with an analysis of the potentials in urban watershed and the study of alternative site designs for enhancing a range of landscape functions related to water quality. Taught by an interdisciplinary team.

L ARCH 550 History and Theory of Modern Landscape Architecture (3)

Lecture/seminar on history and theory of landscape architecture from the eighteenth century to the present. Relation to theory in related environmental design disciplines such as architecture and urban planning and other disciplines such as geography.

L ARCH 561 Regional Landscape Planning and Design (2)

Discussion of theories and case studies that provide a framework for defining sustainable urban design as both a cultural and biophysical phenomenon.

L ARCH 562 Landscape Art (2)

Process of developing and placing artwork in specific landscape settings. Types of artwork and landscape settings; ways for artist and site designer to interpret, alter, and incorporate factors of landscape; viewer's perception and experience; examples of public and private support.

L ARCH 570 Scholarship and Inquiry (3) The first of two required courses on the nature of scholarship and theory building in landscape architecture. Investigate scholarship related to the design process, design critique, research, and practice. Students begin to frame their own scholarship for their master's thesis.

L ARCH 571 Seminar on Landscape Architecture Research (3)

Introduction and exploration of problems and opportunities of several basic research methods currently employed in landscape architecture research. Emphasis on how researchers identify research topics and develop appropriate research methods. Introduce analysis and interpretation of research results.

L ARCH 590 Seminar in Landscape Architecture (1-3, max. 12) Advanced topics in landscape architecture with focus on unpublished areas of research.

L ARCH 598 Special Topics (1-6, max. 9)

Systematic study of specialized regional landscape subject matter, including history, technology, implementation, and other topics depending on current interest/needs. Topics vary and are announced in the preceding quarter.

L ARCH 600 Independent Study or Research (*)

L ARCH 601 Internship (3-9, max. 9) Credit/no credit only.

L ARCH 700 Master's Thesis (*)

Strategic Planning for Critical Infrastructures

SPCI 500 Strategic Planning and Systems Analysis (4) Introduction to two major planning and analytic processes, strategic planning and systems analysis, as applied to the public sector. Includes study of the various elements and types of systems as well as the strategic planning process for public organizations.

SPCI 501 Introduction to Comprehensive Emergency Management (3)

Introduction to emergency management and risk reduction concepts and principles. Includes emergency management tools, techniques, and resources as well as governmental programs, relationships, and the broader social context.

SPCI 502 Constitutional Issues in Homeland Security (3)

Explores the balance between individual liberties and national security. Examines the moral concepts underlying American civil rights and acts of terrorism against the United States. Discusses application of the U.S. Constitution to Homeland Security laws and other governmental actions to protect the nation at home and abroad. Credit/no credit only.

SPCI 504 Applied Geo Spatial Analysis (4)

Provides the theoretical and practical skills needed to use a Geographic Information System (GIS) for analyzing spatial phenomena on the urban and regional scale. Focuses on principles and methods of spatial analysis and their application to strategic planning, risk management, and hazard mitigation.

SPCI 505 Epidemiology of Biological and Chemical Hazards Mitigation I: Principles (3)

Introduction to epidemiology: surveillance for detection of outbreaks, outbreak investigation, and control for infectious agents, toxins, and chemicals. Case studies are drawn from actual outbreaks illustrating these essential epidemiological methods. Examines problem-solving techniques. Credit/no credit only.

SPCI 506 Strategic Planning Practicum I (3)

Uses case-based and problem-based approaches to teach the techniques of planning, decision-making, and analysis common to critical infrastructures.

SPCI 507 Epidemiology of Biological and Chemical Hazards Mitigation II: Application (3)

The second of a two-course sequence, focusing on the applications of the principles of epidemiology covered in Epidemiology of Biological and Chemical Hazards I: Principles. Study cases drawn from actual outbreaks: compare and contrast types, apply knowledge to solve, propose interventions for control, and formulate strategies for preventing outbreaks. Credit/no credit only.

SPCI 508 Risk Assessment and Management (4)

Introduction to processes and methods of risk assessment and management, focusing on how these principles can be integrated into strategic planning and decision making.

SPCI 513 Strategic Planning Practicum 3 (3)

Whittington Uses case-based and problem-based approaches to teach the techniques of planning, decision-making, and analysis common to critical infrastructures. Third in a three-course sequence. Offered: WS.

SPCI 514 Capstone A (3) *Whittington* First of two-part capstone course that provides students with the expertise to develop and teach the problem-based case. Offered: ASp.

SPCI 515 Capstone B (3) *Whittington* Second of two-part capstone course that provides students with the expertise to develop and teach the problem-based case. Offered: ASp.

SPCI 598 Special Topics (1-4, max. 12)

Systematic study of specialized subject matter. Topics vary for each quarter, depending upon

current interest and needs, and are announced in the preceding quarter.

SPCI 599 Special Projects (1-4, max. 12)

Independent/tutorial study for graduate students in the Masters in Strategic Planning for Critical Infrastructures Program. Individual reading, research, fieldwork, or other special project, outlined in advance, approved by, and under the direction of, the faculty advisor most appropriate for the project proposed.

Urban Design and Planning

URBDP 300 Introduction to Urban Planning (5) I&S

Ludwig Principles and theories of urban structure and institutions. Concepts and logic of planning as a community process and a professional activity. Evolution of planning ideas in response to changing social, economic, and environmental conditions within the American political framework. Complementary nature of public and private responsibilities. Major procedures used by planners.

URBDP 301 Database Management Fundamentals (3)

Introduces the tasks and roles that contribute to the management of the design and security of database systems in an organizational context. Students gain a basic understanding of database management systems and administrative practices, as well as hands-on database experience. Credit/no credit only.

URBDP 370 Reading the City (5) I&S/VLPA

Ryan Comprehending cities as reflection of individual reader and social/cultural context. Skills for analyzing everyday, visible evidence of the city. Topics include self-identity with place, city, image and perception, visual design analysis and place as representation of culture. Extensive writing, multiple texts, collaborative work in groups and field work.

URBDP 407 Urban Planning Studio (5) I&S/VLPA

Synthesis of urban design and planning problems and methods in a laboratory section.

URBDP 420 Database Systems and Planning Analysis (3)

Applications of relational database management systems in urban design and planning. Emphasis on practical aspects of database design and use. Design, create, and modify databases and database applications, including spatial databases. Introduction to GIS. Use of personal computers linked to desktop mapping packages and relational database management systems.

URBDP 422 Urban and Regional Geospatial Analysis (5) Alberti

Principles of GIS applied to problems in urban design and planning, landscape architecture, and environmental and resource studies. Practical problem-solving approaches using contemporary desktop mapping packages and vector and raster GIS systems. Siting, environmental evaluation and inventories, and modeling. Prerequisite: 3.0 in URBDP 420. Offered: W.

URBDP 429 Computer-Aided Planning of Urban Systems (3)

Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigation of hardware/software trade-offs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered: jointly with CEE 418.

URBDP 443 Problem Analysis in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluated how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with ESRM 474/GEOG 486/ENVIR 486; A.

URBDP 444 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: URBDP 443. Offered: jointly with CFR 475/GEOG 487/ENVIR 487; W.

URBDP 445 Research in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Students write and orally present revised objectives and methods sections of their interdisciplinary project and present a draft results section. Prerequisite: URBDP 444. Offered: jointly with CFR 476/GEOG 488/ENVIR 488; Sp.

URBDP 446 Practical Experience (4, max. 8) *Rolle* Off-campus internship under academic supervision in situations useful to the education of planners, such as public/private planning and design offices, projects related to the environment, cross-cultural matters, and decision making. Assistance in identifying appropriate projects.

URBDP 450 Introduction to Land Use, Growth Management, and Environmental Planning (3) *Bae* Provides an understanding of contemporary land use issues (including sprawl, smart growth, new urbanism, transit-oriented development, and Washington's Growth Management Act) and examines their environmental impact and social welfare implications. Analyzes best-practice techniques of growth management. Offered: A.

URBDP 451 Housing (3) I&S *Ludwig* Survey of housing and redevelopment problems, theories, standards, and practice. Development of public policies, finance, technological considerations, social factors, and priorities. Prerequisite: 3.0 in URBDP 300.

URBDP 452 Urban Development and Spatial Structure (3) I&S *Miller* Physical and functional structure of urban areas, with major focus on locational decision making in households, firms, and other organizations, and space demands of these urban activities. Selected land-use models illustrating use of this theoretical understanding for forecasting competition, land-use conflicts, and the land-conversion process.

URBDP 453 Introduction to Urban Economics and Development (4) I&S *Waddell* Introduction to urban economics and impacts on real estate development with emphasis on land allocation, location theory, rent/value theory, factors affecting growth and decline of cities, and the role of governmental regulation/policy/finance in controlling real estate development. Offered: jointly with CM 453.

URBDP 457 Housing in Developing Countries (3) *Ludwig* Emphasis on role of the design and planning professional in housing delivery in developing countries. Exploration of issues of culture, political environment, social context, economic circumstances, and other factors which define and limit the manner in which the professional planner and designer can and should function.

URBDP 460 History of City Development (3) I&S/VLPA *Dubrow* Analysis of city forms and designs, emphasizing their relation to the culture of each period.

URBDP 461 History of Urban Planning in the United States (3) I&S *Hancock* Seminar in origins, development, and significance of the American planning movement and the profession that emerged from it, as defined by some of its seminal innovators, theories, practices, and achievements, and as evaluated by cultural realities thereby served.

URBDP 465 Land Use (3) I&S *Westerlund* Land use as a substantive focus for urban and regional planning and growth management. Consideration of data collection, analysis, plan development, and implementation methods. Seminar and group project sections.

URBDP 466 Infrastructure and Community Facilities (4) Blanco Issues and methods associated with planning for parks, schools, drainage, sewerage, utilities, libraries, solid waste and transportation. Covers their relationship to comprehensive plans, project permitting and impact assessment. Financing, regulating, and relationships to social, environmental, and economic goals are discussed.

URBDP 467 Urban Planning Uses of Remote Sensing (3) Westerlund Using aerial photographs and satellite image data in urban planning. Urban change analysis, land-use and land cover classification, and environmental planning applications. Scale and resolution considerations. Development of proficiency through laboratory exercises and use of image-processing software.

URBDP 468 Land Use From Satellite Data (3) Westerlund Digital data from Landsat and other sources used to determine land-use and land-cover classification in urban and rural areas. Hands-on exercises on computer. Photo interpretation, statistics, land-use classification, and verification are incorporated.

URBDP 470 Introduction to Urban Design (3) I&S/VLPA *Rolle* Definitions and examples of urban design; heritage of urban design; theories of city building; the role of urban design in the fields of architecture, landscape architecture, and urban planning.

URBDP 471 History of Urban Design (3) I&S/VLPA *Streatfield* Aspects of form, pattern, and space that mark efforts of individuals and groups to express their values and goals in the design of their cities. Special attention given to both historical and modern examples.

URBDP 472 Creativity and Culture in Design (3) Kasprisin Exploration of creativity in design from a system theory perspective. Theoretical readings in physics, biology, and behavioral science balanced with practical approaches and case studies in urban design and architecture literature. Offered: A.

URBDP 474 Site Planning: Issues and Techniques (3) Abramson Introduction to site planning; how it is regulated; why it is important to know; and how to carry out its key tasks, including residential subdivision and mixed-use development layout; basic topographical and hydrological analysis and manipulation; roadways, parking and hierarchies of circulation, and site design detail. Offered: Sp.

URBDP 479 The Urban Form (3) VLPA *Moudon* Elements, patterns, and evolution of urban form. The forces that shaped cities in history. Contemporary trends. Methods of urban morphological analysis as related to urban design and planning practices. Required for MUP graduate students.

URBDP 481 Metropolitan Planning and Development in Developing Countries (3) I&S *Ludwig* Examination of the nature and causes of urban planning and management problems in developing countries and exploration of alternative approaches to solve some of these problems.

URBDP 482 Politics and Planning (3) I&S Explores the need to understand the crucial role of politics in the planned development of American communities, to think critically and constructively about the relationship of politics and development and ways to make it as democratic and equitable as possible, and to strengthen analytical and writing skills.

URBDP 494 Alaska Field Study (2-5, max. 10) *Kasprisin, Westerlund* Travel to Alaskan communities for interpretation of natural systems, history, cultures, settlement patterns, and current issues of planning and economic development. Meetings with community leaders and planners. Students either select a topic for field and documentary research, or participate in intensive charrette-type projects or quarter-long projects in communities. Offered: Sp.

URBDP 498 Special Topics (1-9, max. 15) Systematic study of specialized subject matter. Topics for each quarter vary, depending upon current interest and needs, and are announced in the preceding quarter.

URBDP 499 Special Projects (1-12, max. 12) Independent/tutorial study for undergraduates. Individual reading, research, fieldwork, or other special project, outlined in advance, approved by, and under the direction of, the faculty adviser most appropriate for the project proposed. A report on the purposes, procedures, and results of the study is required.

URBDP 501 Comprehensive Planning and Implementation (3) Born, Spangenberg, Tovar Reviews the comprehensive planning process as a part of managing metropolitan growth. Examines federal/state statutes affecting local government comprehensive plans. Includes local government land use regulations and reviews development process. Concentrates on tools to shape land use and development patterns and their effectiveness in creating outcomes specified in comprehensive plans. Offered: W.

URBDP 503 Communication and Analysis (3) Kasprisin Development of communication skills understanding within the planning and design process. Presentation of communications as a design process with mental, visual, oral, written, and kinesthetic cognitive actions combined to form communications thinking. Offered: W.

URBDP 506 Planning Studio Prep (2)

Introduces plan-making process, provides time for background research, issue identification, public involvement, and preliminary analysis.

URBDP 507 General Urban Planning

Laboratory (4) Studio/field project in applied professional planning of a comprehensive nature, utilizing a local study area to examine the realities of problem solving in situations of functional and normative conflict. Integration of analysis, programming, implementation, and presentation phases of the planning process.

URBDP 508 Specialized Planning Laboratory

(5, max. 10) *Blanco, Dubrow, Kasprisin, Moudon, Rolfe, Westerlund* Studio/field project on a specialized planning problem. Several options are offered each year, such as regional-environmental planning, housing, metropolitan planning, and urban design. Prerequisite: ARCH 500 and ARCH 507. Additional prerequisite for some sections: urban planning seminar or lecture courses.

URBDP 509 Resources for Urban Planning (1)

Provides an opportunity for students to explore and discuss issues of professional practice with practicing planners in an informal context. Questions posed by the participants usually emphasize practical aspects of working as planners. Credit/no credit only.

URBDP 510 Theories and Methodologies of

Planning I (4) *Bae* Survey of the philosophy, methods, and analytical techniques used in planning public actions and policies, with emphasis on the logic and assumptions upon which these are based. Various planning surveys and methods. Open to graduate students in urban design and planning and to graduate students seeking the urban design certificate. Prerequisite: URBDP 500.

URBDP 511 Theories and Methodologies of

Planning II (4) *Blanco* .

URBDP 512 Research Seminar (3) *Miller*

Planning, designing, and undertaking applied research in an urban setting. Framing, critically assessing, managing, and presenting research used in urban planning and design. Conceptual modeling of causal relationships, choice among experimental and quasi-experimental designs, and ethical and political implications of research undertakings. Exercises leading to a complete research design. Offered: A.

URBDP 519 Qualitative Research Planning (3)

Qualitative research methods covering both the theoretical foundations and practical methodologies of traditional and innovative approaches, including cognitive mapping, open-ended interviews, ethnographic observation, hermeneutics, phenomenology, critical theory, communicative action, grass-roots empowerment, post-structuralism, and self organization.

URBDP 520 Quantitative Methods in Urban

Design and Planning (4) *Bae* Methods of statistical and mathematical analysis in design and planning. Emphasizes the use of computer packages for analyzing urban data. Regression, matrix methods, cohort-survival populations models with examples solved on microcomputers. Prerequisite: college mathematics and basic course in probability and statistics.

URBDP 525 Evaluation in Urban Planning (3)

Miller Methods and techniques for a priori assessment of physical improvement plans,

program designs, public policies. Includes cost effectiveness and matrix or goal achievement, as well as more conventional cost-benefit and cost-revenue forms of analysis. Emphasis on understanding the reasoning and issues in evaluation, and gaining a working competence in at least one of the methods treated.

URBDP 530 Land-Use/Transportation Models

(3) *Waddell* Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land-use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with CEE 588.

URBDP 537 Open Space Land Uses (3)

Westerlund Exploration of public and private values of open space; its aesthetic, environmental, recreational, natural resource uses from development sites to metropolitan regions. Methods of open space inventory, analysis; legal and administrative tools for preserving and managing open space; development of multipurpose open space programs in local governments. Prerequisite: URBDP 500.

URBDP 543 Problem Analysis in Urban

Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with CFR 574; A.

URBDP 544 Applied Theory and Methods in

Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objective and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: URBDP 543 or permission of instructor. Offered jointly with CFR 575; W.

URBDP 545 Research in Urban Ecology (5)

Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised objectives and methods sections of interdisciplinary project and present a draft results section. Prerequisite: URBDP 544. Offered: jointly with CFR 576; Sp.

URBDP 546 Practicum (4, max. 8) *Rolfe*

Off-campus experience under academic supervision in situations useful to the education of planners, such as planning offices, public bureaucracies, projects related to the environment, cross-cultural matters, and decision making. Assistance in identifying appropriate projects. Credit/no credit only. Prerequisite: permission of instructor.

URBDP 547 Professional Project (1-9, max. 9)

Independent development of client oriented project involving application of professional planning/design methods and approaches. Professional-quality report relates project to larger professional context, addresses alternative approaches/methods and includes an evaluation of the project. Master of Urban Planning students only, taken in lieu of 700. Not recommended for

those continuing into Ph.D. program. Credit/no credit only.

URBDP 548 Advanced Urban Ecology (5)

Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen Discussion of current and important theoretical and empirical papers in urban ecology. Students continue to research interdisciplinary urban ecology projects while developing publishable manuscripts and oral presentations. Emphasizes research ethics, diverse views, and presentation skills. Prerequisite: URBDP 543, 544, 545. Offered: jointly with CFR 580/GEOG 588; AWSp.

URBDP 549 Hazard Mitigation Planning (3)

A survey of the field of planning for managing risks of natural hazards—earthquakes, floods, coastal/meteorological hazards, and human-caused technological hazards/terrorism. Covers prevent mitigation through building and land-use controls; disaster preparedness; post-event response, recovery, and mitigation of future hazards. Emphasizes hazard mitigation as a long-term strategy for achieving sustainability of communities.

URBDP 552 Real Estate Process (4) *De Lisle*

Introduction to the real estate process including concept generation, market research, design, construction, finance, and transactions. Offered: A.

URBDP 553 Real Estate Appraisal and

Feasibility (4) Introduction to real estate feasibility analysis, including an emphasis on individual property market analysis, permitting, investment, decision-making, and market behavior. Focuses on building basic research skills to determine economic viability and marketability of real estate projects. Prerequisite URBDP 552.

URBDP 554 Real Estate Finance (4) *De Lisle*

Overview of real estate finance and investment analysis, including a survey of capitol markets, banking regulations, interest/discounting theories, debt instruments, and project financing.. Prerequisite: URBDP 552. .

URBDP 555 Real Estate Development (4) *Rolfe*

Introduction and survey of processes and people involved in developing real estate, including issues of site control, public/private approvals, feasibility analysis, project financing, design/construction, marketing, and asset management. Prerequisite: URBDP 522.

URBDP 556 Real Estate Investment (4) *Rolfe*

Analysis of private and public real-estate investment decisions using case studies of individual development projects. Focuses on application of principles introduced in URBDP 552, 553, 554 and 555. Offered: Sp.

URBDP 558 Real Estate Market Analysis (4)

Fundamentals of market analysis for commercial and residential real estate projects. Demand for real estate by property type, methods for analyzing and forecasting population, employment, and income in a regional economy; competitive supply and capture rate analysis; retail trade area analysis; and integrating market studies into financial feasibility analysis.

URBDP 560 Urban Affairs (3)

Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the

analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with PB AF 560.

URBDP 561 Urban Economics and Public Policy (3) Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with PB AF 561.

URBDP 562 Introduction to Neighborhood Planning and Community Development (3) Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with PB AF 562.

URBDP 563 Seminar in Urban Planning and Policy (1) Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with PB AF 563.

URBDP 564 Planning history, theory and ethics (3) Examines major historical landmarks since the Civil War (urban, suburban, and rural, physical and social-economic); theoretical alternatives (rationalism, pluralism-advocacy, critical theory, bio-regionalism, dissipative models); and ethical issues (such as distributive justice and principles of professional conduct).

URBDP 565 American Urban History (3) Intensive lecture/seminar designed to provide students the opportunity for the immersion in historical scholarship that addresses the social, economical, political, technological, and cultural forces that have shaped the development of American cities.

URBDP 567 Democracy, Citizenship, and Participation in the City (3) *Purcell* Graduate seminar on democracy in cities. Focuses on contemporary ideas, debates, and initiatives. Offered: Sp.

URBDP 570 Urban Design Process (3) *Rolfe* The study of concepts, methods, and processes basic to planning, design, and effectuation. Credit/no credit only. Prerequisite: specialization in urban design or permission of instructor.

URBDP 571 Research and Analytical Methods for Urban Design (3) *Moudon* Conceptual framework for an epistemology of urban design and physical planning. Review of relevant research in related fields and disciplines. Prerequisite: specialization in urban design or permission of instructor.

URBDP 572 Case Studies in Urban Design and Development (3) *Kasprisin* Wide range of urban design and development projects recently completed. Effective urban design implementation, including design process, decision making, administration, management. Tools and techniques such as design analysis, policy making, regulation, design review, taxation, financing. Prerequisite: URBDP 510 and URBDP 580 and/or permission of instructor.

URBDP 574 Residential Design: Methods and Practices (3) *Dubrow* Review of approaches to housing people in growing metropolises and cities, nineteenth century to present. Emphasis on Western Europe, North and South America. Focus on selected contemporary issues in neighborhood and dwelling design, methods and practices. Offered: jointly with ARCH 593.

URBDP 576 Pedestrian Travel, Land Use, and Urban Form (3) *Vernez Moudon* Graduate seminar concentrating on walking as a mode of transportation in cities and city-regions, including social, cognitive, and perceptual dimensions of pedestrian movement and behavior theory. Offered: Sp.

URBDP 580 Legal and Administrative Framework for Planning (3) *Blanco* Political, legal, and administrative institutions closely related to the planning process. Issues of devolution of authority and public representation and participation. Legal basis for planning and associated regulation.

URBDP 585 Introduction to Historic Preservation Planning (3) *Dubrow* Theories, methods, and practices associated with historic preservation planning. Overview of preservation planning programs at federal, state, and local levels. Introduction to tools and methods needed to identify, document, evaluate, and plan for protection of historic properties. Provides opportunity to learn fundamentals of preservation planning through practical experience. Offered: Sp.

URBDP 586 Implementation in Preservation Planning (4) Practical experience in identifying, documenting, evaluating and developing strategies for protection of historic resources, building on introductory theories, methods, and practices. Develops skills critical to preservation planning via research, fieldwork and writing. Prerequisite: introductory course in preservation.

URBDP 587 Preservation and the Vernacular Environment (3) *Dubrow* Exploration of theoretical, methodological, and practical issues related to the preservation of vernacular architecture and cultural landscapes in the United States. Offered: W.

URBDP 591 Doctoral Seminar I (-4-) Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP 592 Doctoral Seminar II (-4-) Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP 593 Doctoral Seminar III (-4-) Researchable issues and research methodology. Discussion and critique of selected pieces of recent research work. Presentation and critique of research proposed by members of the seminar. Prerequisite: master's degree or equivalent in a planning discipline.

URBDP 597 Pacific Northwest Bioregion Forum (1) *Kasprisin* Exchange between universities of Pacific Northwest to share ideas and information on planning related ecological issues within the bioregion.

URBDP 598 Special Topics (1-6, max. 15) Systematic study of specialized subject matter. Topics vary for each quarter, depending upon current interest and needs, and are announced in the preceding quarter. Prerequisite: permission of instructor.

URBDP 600 Independent Study or Research (*) .

URBDP 700 Master's Thesis (*) .

URBDP 800 Doctoral Dissertation (*) .

College of Arts and Sciences

American Ethnic Studies

Afro-American Studies

AFRAM 101 Introduction to African American Studies (5) I&S History, culture, religion, institutions, politics, economics, arts, and psychology of peoples of African descent as developed from experience in both the old and new worlds. Multidisciplinary analysis of social life from a Black perspective as illustrated in selected historical and contemporary writings.

AFRAM 150 Introduction to African-American History (5) I&S Introductory survey of topics and problems in Afro-American history with some attention to Africa as well as to America. Basic introductory course for sequence of lecture courses and seminars in Afro-American history. Offered: jointly with HSTAA 150.

AFRAM 214 Survey of Afro-American Literature (5) VLPA *Butler* A chronological survey of Afro-American literature in all genres from its beginnings to the present day. Emphasizes Afro-American writing as a literary art; the cultural and historical context of Afro-American literary expression and the aesthetic criteria of Afro-American literature. Offered: jointly with ENGL 258.

AFRAM 220 Third World Images in Film (5) I&S/VLPA .

AFRAM 246 African American Politics (5) I&S *P. Rivers* Survey of African Americans within the U.S. socio-political processes. Situates African Americans within a post-civil rights context where there is debate about race's centrality to an African American politics. Recommended: either AES 150, AFRAM 201, or POL S 202. Offered: jointly with POL S 246.

AFRAM 260 African American Family (5) I&S This course explores the structures and functioning of various types of black families. Single-parent families, two-parent families, extended families, and consensual families are explored. Their consequences for male/female relationships are linked and critiqued. Offered: jointly with SOC 260.

AFRAM 261 The African-American Experience Through Literature (5) I&S/VLPA *Scott* Instructs students in hermeneutical and sociological methods of analyses. Analyzes selected novels, essays, poems, short stories, and plays with the purpose of understanding the structures and functions of both society and personality. Offered: jointly with SOC 261.

AFRAM 270 The Jazz Age (5) I&S *Walter* Interdisciplinary study of period after World War I to Great Crash. Afro-American and Anglo-American currents and impulses that flowed together in the Roaring Twenties. Covers politics of normalcy, economics of margin, literature of indulgence and confusion, transformation of race relations, and cultural influence of jazz. Offered: jointly with HSTAA 270.

AFRAM 272 History of the South Since the Civil War (5) I&S *Walter* Reconstruction and its aftermath, the Agrarian (Populist) revolt, disfranchisement and segregation, the effects of urbanization and subsequent depression, desegregation, and the struggle for civil rights.

Examines the New South, the conflict of ideology with structural and material change, and the place of the South in contemporary America.

AFRAM 306 Basic Swahili (5) Maulana Structure of spoken and written Swahili. Concentration on the acquisition of elemental conversational skill and an introduction to written texts of graded difficulty.

AFRAM 307 Basic Swahili (5) Maulana Structure of spoken and written Swahili. Concentration on the acquisition of elemental conversational skill and an introduction to written texts of graded difficulty. Prerequisite: AFRAM 306.

AFRAM 308 Basic Swahili (5) Maulana Structure of spoken and written Swahili. Concentration on the acquisition of elemental conversational skill and an introduction to written texts of graded difficulty. Prerequisite: AFRAM 307.

AFRAM 309 Intensive Basic Swahili (15) Maulana First-year Kiswahili language. Introduces students to Kiswahili and allows them to explore and understand not only the language but also the diverse cultures and customs of the people of East Africa. Provides a basic foundation in speaking, reading, and writing. Primary emphasis on basic structure of Kiswahili and its operation. Offered: S.

AFRAM 315 Black Identities and Political Power (5) I&S *Rivers* Relates the deployment of political power within institutions to shifting racial identities. Shows how racial identities both reflect and inflect relations of domination and resistance within and between cultures in the black diaspora. Prerequisite: either AES 150, AFRAM 150, AFRAM 201, or POL S 201. Offered: jointly with POL S 315.

AFRAM 320 Black Women in Drama (5) VLPA Character types of Black women as represented in plays by Black women. Some Black male playwrights are juxtaposed with Black female writers for comparative analysis. Playwrights include Georgia Douglas Johnson, Angelina Grimke, Alice Childress, Lorraine Hansberry, Ira Aldridge, LeRoi Jones.

AFRAM 321 History of Afro-American Women and the Feminist Movement (5) I&S "Feminist Movement" from early nineteenth century to present. Treats relationship between Black and White women in their struggle for independence, at times together and at times apart. Discusses the reasons, process, and results of collaboration as well as opposition. Examines recent and contemporary attempts at cooperation. Offered: joint with WOMEN 321.

AFRAM 323 African-American Women's History (5) I&S *Yee* Survey of African-American women's experience in United States, 1600 to present. Includes: social, political, economic status of Black women in slavery, freedom, education, activism, Civil Rights, women's rights, other social movements. Explores individual and collective interactions with African-American men, white men and women, other people of color.

AFRAM 334 The Sixties in America: Conflict, Confrontation, and Concession (5) I&S *Walter* Politico-cultural movements that collided in the

sixties. Includes politics of confrontation and civil disobedience, economics of "guns and butter," literature of conflict and angst, polarization of arts, transformation of race relations, role of Rock, and influence of domestic politics on foreign relations. Recommended: AFRAM 150; AFRAM 270. Offered: jointly with HSTAA 334.

AFRAM 337 Music and Social Change in the Sixties Era (5) I&S/VLPA *Walter* Introduction of popular music and social change in 1950s and 1960s. How this interaction effects significant change. Considers political activism for civil rights and against the Vietnam War as they intersect with the development of rock and roll, R&B, acoustic and political folk music, and post-bop jazz.

AFRAM 340 The Harlem Renaissance: A Literary Study (5) VLPA Highlights Harlem Renaissance — 1912 through mid-1930s — as establishing a role for twentieth-century African-American writer, encompassing literature, politics, and decolonization of the image of Africa, and solidifying integrationist and nationalist schools of thought. Examines images, themes, and characterizations in creating a literary aesthetic simultaneously American and African-American.

AFRAM 350 The Black Aesthetic (3) I&S/VLPA .

AFRAM 358 Literature of Black Americans (5) VLPA *Butler, Moody* Selected writings—novels, short-stories, plays, poems—by Afro-American writers. The historical and cultural context within which they evolved. Differences between Afro-American writers and writers of the European-American tradition. Emphasis varies. Offered: jointly with ENGL 358.

AFRAM 370 Afro-American Political Thought (5) I&S Political ideologies and philosophies of pivotal Afro-American historical figures and the conditions under which these ideologies are developed, rejected, and transformed. How ideologies relate to solution of Afro-American political problems.

AFRAM 401 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: either AFRAM 308 or AFRAM 309.

AFRAM 402 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 401.

AFRAM 403 Intermediate Swahili (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Swahili. Review of structure. Prerequisite: AFRAM 402.

AFRAM 437 Blacks in American Law (5) I&S *Walter* Historical continuity for changing relationship between American jurisprudence and Black Americans, 1640-1986. Statutory and case law which determined role of Blacks in American society, and use of law by Blacks to gain civil and personal rights.

AFRAM 498 Special Topics in African American Studies (3-5, max. 15) I&S Topics in

which students and faculty have developed an interest as a result of work done in other classes or as a result of the need to investigate in greater depth Afro-American Studies issues. Topics vary.

AFRAM 499 Independent Study and Research (1-5, max. 10) Identification and investigation of the problems and needs of the Black community. Methods and alternatives of approaching these problems and needs. Students designate their areas of interest and subsequently pursue research and problem solving.

American Ethnic Studies

AES 150 Introductory History of American Ethnic Groups (5) I&S *Gamboa, Salas* Survey of the history of African Americans, Asian Americans, Chicanos, and American Indians in the United States.

AES 151 Introduction to the Cultures of American Ethnic Groups (5) I&S Survey of the cultures of Chicano, African-American, Asian-American, and American-Indian communities of the United States. Each group's culture is examined in its isolation and in its interaction with mainstream culture.

AES 212 Comparative American Ethnic Literature (5) I&S/VLPA *Butler* Selected texts from the African-American, American-Indian, Asian-American, Chicano/Latino, and Euro-American traditions of American literature. Examines the American Dream, identity, community, conformity, individualism, and family. Explores themes of assimilation, double consciousness, *mezitza* consciousness, and wholeness as an introduction to multiple American voices in literary expression.

AES 250 Race in the American University (5) I&S Racial integration in American institutions of higher education. Entry to, and impact on, American universities by people of color. History of ethnic studies and its relation to other disciplines. Recommended: AES 150; AES 151.

AES 310 Women of Color as Cross-Cultural Artists (5) I&S/VLPA *Habell-Pallan* Provides a historical context for artistic forms produced by racialized women. Examines the cultural production of Chicanas and Latinas in relation to that Native American, African American, East and South Asian American, and Arab American women as well as those women of mixed heritage in the U.S. Offered: jointly with WOMEN 351.

AES 322 Race and Gender: Historical Perspectives (5) I&S The intersection of race and gender in the lives of women of color in the United States from historical and contemporary perspectives. Topics include racism, sexism, activism, sexuality, and inter-racial dynamics between women of color groups. Offered: jointly with WOMEN 322.

AES 330 Beyond Civil Rights: Law, Culture, and Change (5) I&S Assessment of the contemporary politics of civil rights as shaped by an identity politics that is both significant and passe. Recommended: LSJ 363 or one course in either AES or WOMEN. Offered: jointly with LSJ 330.

AES 333 Race and Ethnicity in the U.S. Military (5) I&S *Salas* The experiences of racial minorities in the military. Topics include segregation of units, desegregation of military, career limitations and opportunities, minority

women, military families, racism and role of veterans in civil rights struggles after service.

AES 335 Sports and Social Change in the Twentieth Century (5) I&S *Walter* Development of sport in the US and its importance for US culture and society. Covers increased centrality of athletic competition as part of the new leisure time in the late-19th century, revival of the Olympic movement, racial segregation/integration, today's American notions of celebrity and social style.

AES 361 Ethnicity, Business, Unions, and Society (5) I&S *Scott* Interrelationships of ethnicity, business, unions, and the larger society. Examines financial and sociological structure of business and manufacturing sector, how this sector performs, and consequences of performance for selected ethnic groups in United States. Offered: jointly with SOC 363.

AES 404 Critical Pedagogies of Social Change (5) I&S Examines theories of critical pedagogy as developed in struggles against race, class, and gender oppression in the U.S. and transnationally. Topics include the relation between theory and practice, the position of educators in struggles for social change, and the role of the arts in movement-building. Offered: jointly with WOMEN 404.

AES 446 Music in American Cultures (3) I&S/VLPA Compares musical history and experience of selected American cultures that have fed into the American musical mainstream or had significant popularity on its periphery. Case studies may include African Americans, Latino/a Americans, Jewish Americans, Asian Americans, or European Americans. Considerations of social identity as well as musical styles. Offered: jointly with MUSIC 446.

AES 461 Comparative Ethnic Race Relations in the Americas (5) I&S Sketches the ethnoracial systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnoracial systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with SOC 461.

AES 462 Comparative Race and Ethnic Relations (5) I&S *Scott* Race and ethnicity are examined as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Offered: jointly with SOC 462.

AES 487 Cultures and Politics of Environmental Justice (5) I&S *Pena* Comparative survey of environmental justice movements in the world with focus on critical studies of environmental racism, risk, and sustainable development. Provides theoretical knowledge and research methods incorporating the study of equity and autonomy in environmental impact and risk assessment and other aspects of environmental policy politics. Offered: jointly with ANTH 487.

AES 489 Ethnicity, Gender, and Media (5) I&S Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with COM 489/WOMEN 489.

AES 494 Community Practicum and Internship (3-5, max. 10) Faculty supervised practicum and internship experience in variety of settings and agencies, e.g., ethnic specific

agencies, government and civic community-based offices. Students contribute skills and knowledge to respective communities and gain experience by working with professionals and community organizers. Credit/no credit only.

AES 495 Senior Seminar (5) I&S Focus on a central comparative theme for individual research topics.

AES 496 Senior Seminar II (5) I&S Second of a two-part senior seminar sequence required of all majors. Research and writing of a senior paper under supervision of an appropriate faculty adviser. Prerequisite: AES 495. Offered: AWSpS.

AES 498 Special Topics in American Ethnic Studies (1-5, max. 15) I&S Designed to provide the student an opportunity to concentrate on one specific aspect of American Ethnic Studies through a comparative, interdisciplinary approach.

AES 499 Independent Study or Research (1-5, max. 10) Independent readings and/or research under the supervision of a faculty member.

Asian-American Studies

AAS 101 Introduction to Asian American Cultures (5) I&S Asian-American subcultures; evolution of Asian-American cultures in the United States from 1850 to 1950-immigration patterns, evolution of subcultures, evacuation, interracial relations, assimilation, and signs of social disorganization.

AAS 206 Contemporary Problems of Asian Americans (5) I&S Recent Asian-American issues from 1950 to the present. Topics include ghetto communities, civil rights, identity problems and ethnicity, social organizations, political movements, and recent immigration.

AAS 210 Asian-American Identity (5) I&S Examines the nature of Asian-American identity from a multidisciplinary approach. Explores influences and manifestations of Asian-American identity, using literature, history, and other texts. Topics to include gender issues, interracial relationships, and Amerasians. Recommended: AAS 101; AAS 206.

AAS 220 Asian-American Stereotypes in the Media (5) I&S Asian stereotypes popularized by American literature, film, radio, and television and their effects on Asian American history, psychology, and community.

AAS 300 U.S. Pacific Islander Contemporary Culture (5) I&S *McGrath* Examines U.S. Pacific Islander culture as informed by Pacific history, social and cultural organization. Emphasis on understanding contemporary experience in the U.S. and other diaspora communities. Major themes include post-colonialism, migration, family, religion, politics, gender, education, and transnational identity. Recommended: either ANTH 202 or AES 151. Offered: jointly with ANTH 307. Offered: Sp.

AAS 306 Basic Tagalog (5) Structure of spoken and written Tagalog. Concentration on the acquisition of elemental conversational skill and introduction to written texts of graded difficulty. Offered: A.

AAS 307 Basic Tagalog (5) Structure of spoken and written Tagalog. Concentration on the acquisition of elemental conversational skill and introduction to written texts of graded difficulty. Prerequisite: AAS 306. Offered: W.

AAS 308 Basic Tagalog (5) Structure of spoken and written Tagalog. Concentration on the acquisition of elemental conversational skill and introduction to written texts of graded difficulty. Prerequisite: AAS 307. Offered: Sp.

AAS 320 Hawaii's Literatures (5) VLPA *Sumida* Prose fiction, historical narratives, and poetry (including lyrics and songs) of Hawaii by Native Hawaiian and multicultural local writers and composers of the nineteenth and twentieth centuries. Analyses of colonization and its consequences frame the literary studies.

AAS 330 Asian American Theater (5) VLPA *Sumida* Explores works of Asian American plays in historical, interpretive, and artistic contests and dimensions. Includes students' performances of dramatic readings.

AAS 350 Chinese American History and Culture (5) I&S Experience of the Chinese in America from 1850 to the present. Transformation from an immigrant to Chinese American community: immigration patterns, anti-Chinese movements, ethnic sociopolitical and economic institutions, community issues, Chinese American culture. Recommended: AAS 205.

AAS 360 Filipino-American History and Culture (5) I&S *Revilla* History and culture of the Filipino in America and the influence of an admixture of Filipino, Spanish, and American traditions on the Filipino immigrant and his or her descendants. Recommended: AAS 205.

AAS 370 Japanese-American History and Culture (5) I&S Historical roots and subsequent changes in the Japanese-American group examined through an interdisciplinary approach. Topics include historical events, culture, values, social and community structures, institutions, occupations, and future orientations. Recommended: AAS 205.

AAS 372 Internment Camps in North America: United States and Canada (5) I&S Comparative study of United States and Canadian internment camps incarcerating Japanese Americans and Japanese Canadians during World War II. Focuses on early history, dislocation and internment, effects (disorganization and adjustments), effects on the internees and society, and present situation.

AAS 380 Asian-American Communities and Social Policies (5) I&S History, culture, social organization, leadership patterns and interethnic relations of Asian-American (Chinese, Filipino, Japanese, and Korean) communities. Origins and impact of social policies relevant to Asian-American communities. Recommended: AAS 205.

AAS 385 Asian Americans: The Law and Immigration (5) I&S Traces the evolution of United States immigration law and policy from the nineteenth century to modern day, from free immigration to immigration restriction, through the elimination of race as a criterion, and culmination in the passage of the Simpson-Mezzoli bill. Recommended: AAS 205 or AAS 206.

AAS 392 Asian-American Women (5) I&S History of and contemporary issues related to Asian-American women in the United States. Recommended: AAS 205 or AAS 206. Offered: jointly with WOMEN 392.

AAS 395 Southeast-Asian Americans: History and Culture (5) I&S

AAS 401 Asian-American Literature to the 1940s (5) VLPA Asian-American literature from nineteenth-century immigrants to the 1940s. Emphasis on Chinese, Japanese, and Filipino writings detailing the experience and sensibility of first generation immigrants. Early twentieth-century writing focus on the development not only of Asian-American community, but also of second generation American-born Asian-American writers. Recommended: AAS 205 or AAS 206.

AAS 402 Contemporary Asian-American Literature (5) VLPA Asian-American literature from the 1940s to the present. Emphasis on the development of attitudes and identities in contemporary Asian-American literature, the role of the writer in a minority culture, and the relationship of literature to self and society.

AAS 403 Survey of Asian-American Poetry (5) VLPA Asian-American poetry, nineteenth century to present. Readings include poetry of the early immigrant to America, cultural imperatives transferred from old world to new world, and establishment of an Asian-American identity in poetry from 1870s through 1890s.

AAS 406 Asian American Activism (5) I&S Explores the multiple political traditions forged by Asian Americans, from the earliest challenges to racist laws and unequal wages to the latest debates over affirmative action and racial profiling. Examines Asian American communities organized to oppose and to perpetuate social inequalities. Offered: jointly with HSTAA 406.

AAS 416 Intermediate Tagalog (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Tagalog. Review of structure. Prerequisite: AAS 306, 307, 308. Offered: A.

AAS 417 Intermediate Tagalog (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Tagalog. Review of structure. Prerequisite: AAS 416. Offered: W.

AAS 418 Intermediate Tagalog (5) VLPA Readings from prose to traditional poetry. Emphasis on acquiring an ability to manipulate ideas in Tagalog. Review of structure. Prerequisite: AAS 417. Offered: Sp.

AAS 426 Advanced Tagalog (5) VLPA *faculty* Reading of contemporary Filipino (Tagalog) prose, poetry, and drama. Advanced conversation and composition. Prerequisite: AAS 418. Offered: A.

AAS 427 Advanced Tagalog (5) VLPA *faculty* Reading of contemporary Filipino (Tagalog) prose, poetry, and drama. Advanced conversation and composition. Prerequisite: AAS 426. Offered: W.

AAS 428 Advanced Tagalog (5) VLPA *faculty* Reading of contemporary Filipino (Tagalog) prose, poetry, and drama. Advanced conversation and composition. Prerequisite: AAS 427. Offered: Sp.

AAS 498 Special Topics (5, max. 10) I&S

AAS 499 Undergraduate Independent Study (1-5, max. 10)

Chicano Studies

CHSTU 101 Introduction to Chicano Studies (5) I&S *Gamboa, Salas* Selected themes in Chicano experience; studies in Chicano politics and Chicano socioeconomic concerns.

CHSTU 180 History of the Chicano People to 1848 (5) I&S *Gil* Historical survey of the Chicano people from pre-Hispanic times to the war between the United States and Mexico. Offered: jointly with HSTAA 283.

CHSTU 200 Latinos in the United States (5) I&S *Gamboa, Salas* Historical, social, and economic experience of Latinos in the United States. Major themes include education, labor, class, and gender identity. Analyzes rapid growth of old and newly established Latino communities, based on emigration from Latin America.

CHSTU 254 Northwest Latinos: History, Community, Culture (5) I&S *Gamboa* Traces the history, extent, and development of the Chicano/Latino presence from the early Spanish period to the present. Examines the major contemporary political, social, and economic issues affecting Northwest Chicano/Latinos in a broader national and international context.

CHSTU 255 Mexican Women: Past and Present (5) I&S *Salas* Survey of women in Mexican society from Meso-American times to the 1940s.

CHSTU 256 Chicanas: Gender and Race Issues (5) I&S *Salas* Contemporary issues in the Chicana movement since the 1940s. Issues range from feminism and Chicana political, educational, and social organizations, to work, family, health, and the arts.

CHSTU 260 Introduction to Chicano Politics (5) I&S Surveys the political position and activities of Mexican-American peoples in the United States from two perspectives: (1) Chicanos as objects of the political process of United States life, (2) contributions of the Chicano people to United States politics.

CHSTU 330 Chicano/Chicana Autobiography (5) I&S Explores the issue of Chicano, or Mexican-American, identity. Examines statements of selfhood by Chicanos, studied in order to understand the relationship between individual and society in creating identity.

CHSTU 340 Latina/Latino Theater (5) VLPA *Habell-Pallan* Explores the contextual, theoretical, thematic, and formal dimensions of U. S. Latina and Latino theater and performance art in the contemporary period. Examines performances and play scripts as a way of analyzing innovations in form, language, and content produced by Chicano/Latino teatro and performance art.

CHSTU 352 Mexican Immigration: A Comparative Analysis (5) I&S *Gamboa, Salas* Examines and compares constant Mexican immigration with that of other immigrants to the United States as one of the most important issues confronting Chicanos and other Americans in the United States.

CHSTU 356 The Chicano Family (5) I&S *Salas* The historical, psycho-social, and sociocultural role of the Chicano family from Meso-American times to the present.

CHSTU 405 Advanced Chicano Studies (5) I&S *Gamboa* Chicano culture as related to current values and health practices, Mexican labor and immigration in both historical and contemporary setting. Chicano politics 1848 to present. Recurrent problems of Chicanos in society; social movement for acceptance and for self-determination.

CHSTU 410 Latina Cultural Production (5) I&S/VLPA Explores the expressive culture of Chicana/Mexican American/Latina women in the United States. Cultural and artistic practices in home and in literary, music, film, spoken word, performing and visual arts. Focuses on how Chicana/Latina writers and artists re-envision traditional iconography. Offered: jointly with WOMEN 451.

CHSTU 416 Comparative Social Movements: Mexico and the United States (5) I&S *Pena* Historical, ethnographic, and theoretical perspectives in the study of Mexican-origin communities in social movements in Mexico and the United States with a focus on workers, immigrants, peasants, women, indigenous peoples, and students as forces of collective mobilization and social, cultural, and political change. Offered: jointly with ANTH 416.

CHSTU 498 Special Topics in Chicano Studies (3-5, max. 10) I&S *Gamboa, Olguin, Salas* Interdisciplinary course concentrating on one or more aspects of the Chicano experience.

CHSTU 499 Independent Study and Research (1-6, max. 10) *Gamboa, Olguin, Salas* Students work individually or in teams.

American Indian Studies

AIS 110 Musical Traditions of Native North America (3) VLPA Utilizes historical and contemporary sources to survey the music and music-related traditions of Native North America. Examines traditional music and context from the Northwest Coast, Arctic, Southwest, Great Basin, Plains, Plateau, California, and Eastern Woodlands music-style areas, as well as contemporary neo-traditional and popular genres of American Indian music.

AIS 113 American Indian Language: Navajo (5) *Witherspoon* Conversation, reading, and writing in Navajo. Oral literature and other aspects of Navajo culture integrated into language study.

AIS 114 American Indian Language: Navajo (5) *Witherspoon* Conversation, reading, and writing in Navajo. Oral literature and other aspects of Navajo culture integrated into language study. Prerequisite: AIS 113.

AIS 115 American Indian Language: Navajo (5) *Witherspoon* Conversation, reading, and writing in Navajo. Oral literature and other aspects of Navajo culture integrated into language study. Prerequisite: AIS 114.

AIS 151 Indian Art of Northwest Coast (3) VLPA *Oliver* Studio course on Pacific Northwest coast Indian/Eskimo art. Traditional and contemporary forms; principles of form, style, and techniques; values that influence Indian/Eskimo art styles.

AIS 170 Survey of North American Indian Art (5) VLPA Major American Indian art traditions of North America. Precontact and early-contact-era traditions and the evolution of Indian art forms in

contemporary times. Design and techniques in Indian art.

AIS 202 Introduction to Contemporary Experience in Indian America (5) I&S Survey of contemporary Native-American people, cultures, and issues. Focus on modern experiences through readings from Native-American autobiographies, contemporary narratives and literature, and reports of important topical issues, e.g., water rights, Indian gaming, treaty law.

AIS 203 Introduction: Philosophical and Aesthetic Universes (5) I&S Social constructions of reality, aesthetic as well as philosophic, as conceptualized by approximately five traditional American Indian cultures from different regions of North America.

AIS 230 Contemporary Indian Gaming and Casinos (5) I&S *Wright* Overview of the contemporary \$18.5 billion Indian Tribal gaming industry (with a focus on the Pacific Northwest), which is heavily regulated, is an economic engine for non-Indian communities, and funds economic, social and cultural revitalization of Indian Reservations, yet often generates intense political discussions. Offered: .W.

AIS 240 Native North American Women (5) I&S Indian women in the social structure; historical and contemporary roles; changes in male-female relationships; problems and opportunities of contemporary women; the feminist movement and Indian rights.

AIS 253 Wood Design (3, max. 9) VLPA *Oliver* Studio course in wood sculpture utilizing Pacific Northwest Indian hand tools. Properties of woods and their uses.

AIS 311 North American Indians: Pacific Northwest (5) I&S Traditional societies of the Pacific Northwest from southern Alaska to northern California; significant areal features, such as rank, totemic crests, guardian spirits, the potlatch, fishing, and foraging illustrated by comparisons and by selected ethnographic sketches. Continuity between past and present. Recommended: ANTH 100 or ANTH 202.

AIS 312 North American Indians: The Intermountain West (5) I&S Traditional cultures of Columbia and Fraser Plateau region and Great Basin: Interior Salish, Sahaptin and Nez Perce, Paiute, and their neighbors. Regional features of language, ecology, social life, myth, religion. Contemporary issues of reservation life, government, ethnic conflict in historical perspective. Recommended: ANTH 100 or ANTH 202.

AIS 316 North American Indians: The Southeast to 1850 (5) I&S Emphasis on prehistory, social organization, belief system, political alliances. European contact, effects of plantation slavery and slave trade on Indians, issues of ethnicity, and consequences of removal policies.

AIS 317 North American Indians: The Southwest (5) I&S *Witherspoon* Overview of history and ethnography of the Southwest with emphasis on Apacheans, Pueblos, and Pimans/Yumans. Social organization, religion, worldview, and expressive culture of such specific groups as Navajo, Hopi, Zuni, Tewa, and Tohono O'odham.

AIS 330 United States-Indian Relations (5) I&S *Harmon* History of relations between American Indians and non-Indians in the U. S. with

emphasis on national laws and policies. Examines origins and impacts of Indians' and non-Indians' strategies for dealing with each other, historical reasons for Indians' contemporary conditions and status.

AIS 331 American Indian History I: European Discovery to 1840 (5) I&S *Harmon* History of Indigenous peoples and their descendants in the area that now constitutes the United States, from the eve of European discovery of the Americas to 1840. Emphasis on relations between Indigenous peoples and immigrants. Offered jointly with HSTAA 331.

AIS 332 American Indian History II: 1840 to Present (5) I&S *Harmon* History of American Indians in the United States from 1840 to the present. Emphasis on relations between Indians and non-Indians, government policies, and Indian strategies of survival. Offered jointly with HSTAA 332.

AIS 335 American Indians and the Law (5) I&S *Harmon* History of laws governing American Indians: aboriginal law systems, U. S. laws, and contemporary tribal laws. Effects of laws and legal institutions on contemporary Indian identity and tribal status, self-government, land ownership and use, natural resources, religion, family life, cultural and spiritual practices, crimes and punishment, and federal responsibilities for Indians.

AIS 340 Indian Children and Families (5) I&S Cross-cultural survey of Indian child rearing, family structure, and related social issues. Includes historical changes in family structure, value orientation and adaptation to a bicultural environment, education, child welfare, health problems, and aging.

AIS 341 Native Women in the Americas (5) I&S Historiography, sociology, biography, autobiography, and fiction about native women in the United States and Canada. Offered: jointly with WOMEN 341. Offered: AWSpS.

AIS 350 Two-Dimensional Art of the Northwest Coast Indians (3, max. 9) VLPA *Oliver* Studio course emphasizes principles of structure and style of two-dimensional art which can be found on many old, traditional Northwest Coast pieces, such as painted storage boxes and chests, house panels, and ceremonial screens. Students apply these principles in creating a variety of graphic projects.

AIS 360 American Indians in Cinema (5) VLPA/I&S *Cote* Studies representations of American Indians in American films from 1900 to present. Examines the foundations of American Indian stereotypes and how Hollywood helped create and perpetuate those stereotypes. Activities include reading critical materials, and viewing, discussing, and writing critically about films by non-native directors. Offered: ASpS.

AIS 370 Researching Indians' History (5) I&S *Harmon* Finding and interpreting sources of information about American Indians' history. Offered: jointly with HSTAA 315:.

AIS 376 First Nations Literature (5) VLPA *Cote* Literature written by First Nations Canadian authors as a form of cultural resistance and a reasserting of identity. Offered: S.

AIS 377 Contemporary American Indian Literature (5) VLPA *Colonnese* Creative writings-novels, short stories, poems-of

contemporary Indian authors; the traditions out of which these works evolved. Differences between Indian writers and writers of the dominant European/American mainstream. Offered: jointly with ENGL 359.

AIS 378 Contemporary American Indian Literature: A Northwest Focus (5) VLPA

Literature and poetry of the Pacific Northwest (Coast and Plateau) Native peoples. Contemporary literature and discussion of social and cultural issues raised by American Indian writers and writing. Offered: AW.

AIS 379 Powwow: Tradition and Innovation (5) VLPA/I&S Explores the historical and cultural roots of powwow. Discusses the ways this Indigenous Native art form has adapted since prehistoric times. Includes planning and staging of the annual UW First Nations Powwow.

AIS 425 Indians in Western Washington

History (3) I&S *Harmon* Relations of Indians and non-Indians in the Puget Sound region, from the 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with HSTAA 417.

AIS 431 History of American Indian Education

(5) I&S Traditional and European-introduced methods of schooling, the federal role in Indian education, and contemporary Indian education issues. Special attention to Indian concepts of learning; boarding school education; the role of the Bureau of Indian Affairs; current trends in bilingual and bicultural education for Indians.

AIS 435 Spiritual Encounters: Native

Spirituality in the Contact Era (5) I&S *Wright* Explores North American Indigenous interaction with, resistance to, and syncretization with Christianity, the European colonizers' religious system. Focuses on Native revitalization movements and new forms of religious expression such as the Indian Shaker Church and the Peyote Road, as well as the legal, social, and cultural issues of Native freedom of religion. Offered: W.

AIS 440 Reading Native American Women's

Lives (5, max. 10) I&S *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada. Offered: jointly with WOMEN 440.

AIS 441 Gender in Native American Societies

(5) I&S *Cote* Examines gender roles, identity, and relations in Native American pre- and post-contact societies. Analyzes how contact with European gender customs influenced and altered traditional gender practices, especially in regards to women's social position and the roles of the third/fourth genders in Native American communities.

AIS 442 Images of Natives in the Cinema and

Popular Cultures (5) I&S/VLPA *Ross* Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Offered: jointly with WOMEN 442.

AIS 443 Indigenous Films, Sovereign Visions

(5) VLPA/I&S *Cote, Hart, Ross* Explores fiction, documentary, experimental film, and digital media from indigenous artists from around the world. Focuses on personal, political, and cultural expression. Issues include media and sovereignty movements, political economy, language

revitalization, the politics of decolonization, and indigenous aesthetics. Offered jointly with COM 443.

AIS 450 American Indian Song and Dance

Tradition: Performance (3) VLPA Performance of various American Indian social dances, songs, and games. In-depth study of various American Indian vocal styles.

AIS 451 Critical Conversations in American

Indian Studies (5, max 10) Critical issues in American Indian Studies. Topics vary. Offered: Sp.

AIS 461 First Nations Government and

Politics in Canada (5) I&S *Cote* Focuses on First Nations government and politics in Canada. Examines development of First Nations political governing structures with an introduction to the values, perspectives, concepts, and principles in Native political cultures. Explores federal Indian policy in context of First Nations strategies to become self-governing.

AIS 466 Producing the Documentary Short (5)

VLPA *Cote, Gibbons, Hart, Ross* Explores documentary theory, methods, and aesthetics. From humanities, social science, and Indigenous studies perspectives, students critique a self-produced documentary, looking at methodology, perspective, and ethics. Students also explore pre-production, production, and post-production documentary techniques.

AIS 469 Special Studies in American Indians

(3, max. 6) I&S Delineation and analysis of a specific problem or related problems in American Indian Studies. Offered occasionally by visitors or resident faculty.

AIS 475 Special Topics in Indian Studies (1-5,

max. 15) I&S Current research and readings in American Indian Studies content areas.

AIS 498 Senior Project (5)

Intensive research and presentation on a selected issue. For students majoring in American Indian Studies or other advanced students by permission. Offered: AWSp.

AIS 499 Independent Study (1-5, max. 15)

Readings and/or research under faculty supervision.

AIS 501 Documentary Film/Video Research

Methods in Native Communities (5) Seminar exploring theoretical, methodological, and aesthetic issues when research documentary film and video projects in Native American communities. Utilizes readings, screening, discussions, and a major research project to explore issues of documentary representation, ethics, and historiography. First part of a two-quarter documentary production sequence. Offered: AWSpS.

AIS 503 Documentary Theory, Form, and

Practice (5) Explores documentary theory and practice, utilizing readings and documentary filmmaking exercises. Students create short documentary sequences while investigating traditional and more experimental ideas about the non-fiction form; theories of representation, subject ethics, documentary authenticity, the intersection of fiction and non-fiction forms, documentary and performance, documentary and historiography.

AIS 590 Special Topics (1-5, max. 15) Offered by visitors or resident faculty as a one-time, in-depth study of special interest.

Anthropology

Anthropology

ANTH 100 Introduction to Anthropology (5)

I&S Introduction to the subfields of archaeology, biocultural anthropology, and sociocultural anthropology through the examination of selected problems in human physical, cultural, and social evolution. Not recommended for students who have had other courses in anthropology, archaeology, or biocultural anthropology. May not be counted toward the 55 credits required for the major in anthropology. Offered: AWSp.

ANTH 150 Culture and Rights: Exploring the

Meaning and Practice of Human Rights (5) I&S Examines social justice issues with the aim of obtaining deeper understanding of human rights. Analyzes historical and theoretical foundations and introduces international and regional institutions designed to implement and enforce human rights. Case studies in sovereignty, war crimes, ethnic cleansing, genocide, torture, truth commissions, and forgiveness.

ANTH 202 Principles of Sociocultural

Anthropology (5) I&S Comparison of lifeways of various non-Western and Western peoples. Introduction to basic theories and methods used in the field.

ANTH 203 Introduction to Anthropological

Linguistics (5) I&S/VLPA Linguistic methods and theories used within anthropology. Basic structural features of language; human language and animal communication compared; evidence for the innate nature of language. Language and culture: linguistic relativism, ethnography of communication, sociolinguistics. Language and nationalism, language politics in the U.S. and elsewhere. Offered: jointly with LING 203.

ANTH 204 Reading Ethnography (5) I&S

Introduction to the descriptive and analytic literature of cultural anthropology. Extended examination of representative accounts of the lifeway of peoples from selected areas of the world with an emphasis on methods of observation and analysis.

ANTH 206 The Cultural Animal (5) I&S/NW

Examination of the interaction between biology and culture in shaping human social behavior. Basic principles of natural selection, gene-environment interaction, cultural transmission, learning, and cultural evolution; application of these to various topics, including gender, violence, politics, kinship, and religion.

ANTH 207 Class and Culture in America (5)

I&S Anthropological view of the contemporary United States with emphasis on social class. Through ethnographic readings examines education, work, political economy, working class experience and the ideology of the middle class, and relations between class and race, gender, ethnicity, language, place, sexuality, and culture.

ANTH 208 The Culture Concept (5) I&S

History of the culture concept and its use in the field of cultural anthropology. History of its emergence in European colonial expansion and contemporary debates about its place as the central concept defining the field of anthropology.

ANTH 209 Anthropology Through Visual Media (5) I&S/VLPA Theories of culture and cultural variation, as seen and understood through visual media such as films, video, and photography.

ANTH 210 Introduction to Environmental Anthropology (5) I&S Introduction to human/environment interactions from various anthropological perspectives. Intellectual history of anthropological approaches to environment, emphasizing the mutual interconnectedness of people and nature. Survey of evolutionary models; cultural ecology; systems approaches; indigenous knowledge; ethnoecology; nature and the state; political ecology; ecofeminism; and environmentalism.

ANTH 228 Identities: Race, Class, Gender, and Sexuality in Anthropology (5) I&S An introduction to the study of race, class, gender, and sexuality in anthropology. Through ethnographic and theoretical readings, students are introduced to the concept of identity as intersectional construction and social performance.

ANTH 289 Identities: Service Learning (3) I&S . Engages students in volunteer activities in order to explore the process of social change around intersections of race, class, gender, and sexuality. A service learning companion course to ANTH 228. Students must be enrolled in ANTH 228 in order to enroll in ANTH 289.

ANTH 301 Human Nature and Culture (3) I&S Comparison of various anthropological perspectives on the sources of variation in customs, values, and beliefs of human groups, including non-Western peoples and contemporary Americans.

ANTH 305 Anthropology of the Body (5) I&S Surveys classic anthropological literature examining the relationship between culture and the body. Examines Euroamerican body culture historically. Explores how the body is represented in mass media and the effects this has on everyday body ideologies.

ANTH 306 Representations of the Pacific Islands and Islanders (3) I&S/VLPA Kahn Explores written texts and visual images about the Pacific Islands and Islanders in an effort to understand the power of representation and its relationship to the construction of knowledge. Examples drawn from early explorers, artists, novelists, anthropologists, the tourist industry, and Pacific Islanders.

ANTH 307 U.S. Pacific Islander Contemporary Culture (5) I&S McGrath Examines U.S. Pacific Islander culture as informed by Pacific history, social and cultural organization. Emphasis on understanding contemporary experience in the U.S. and other diaspora communities. Major themes include post-colonialism, migration, family, religion, politics, gender, education, and transnational identity. Recommended: either ANTH 202 or AES 151. Offered: jointly with AAS 300. Offered: Sp.

ANTH 308 Anthropology of Women's Health and Reproduction (5) I&S Chapman Introduction to anthropological approaches to women's health, addressing women's health status and participation in healthcare. Topics include reproductive health, women's bodies and sexuality, social policy in relation to gender, race, ethnicity, and class. Emphasis on how the politics of gender shapes women's experiences of health care institutions in the U.S.

ANTH 310 Native North American Societies (5) I&S Smith Traditional cultures of America north of Mexico, emphasizing diversity of North American Indian and Eskimo societies. Origins of Native-American culture areas and language groupings; subsistence systems; levels of social organization; European conquest and colonialism; and description of representative cultures from the ten culture areas. Recommended: ANTH 100.

ANTH 312 Pacific Islands Literature (5) I&S/VLPA Focuses on works written by Pacific Islanders (novels, short stories, plays, and poetry) since the 1970s. Explores colonialism and its effects on indigenous peoples. Examines discourses of gender, class, and cultural identity within the Pacific Islands region.

ANTH 313 Peoples of Africa (5) I&S Survey of the many cultures of pre- and post-colonial sub-Saharan Africa. Appreciation of the adaptability, strength, and creativity of African peoples. Recommended: ANTH 100.

ANTH 314 Culture, Environment, and Identity of Island Southeast Asia (5) I&S Lowe Anthropological study of colonial and post-colonial contexts of Island Southeast Asia. Emphasis on historical legacies, influence of world religions, formation of national and collective identities, revolution and national politics, and modernities. Prerequisite: either one 200-level ANTH course, LING 203, or one SIS course. Offered: jointly with SISSE 314.

ANTH 315 Southeast Asian Civilization: Buddhist and Vietnamese (5) I&S Keyes Civilizations of Theravada Buddhist societies in Burma, Thailand, Cambodia, and Laos and in Vietnamese societies of Southeast Asia. Culture of tribal peoples who live on peripheries of these societies. Cultural transformations consequent upon the war in Indochina and resettlement of Indochinese refugees in United States. Offered: jointly with SISSE 315.

ANTH 316 Modern South Asia (5) I&S Twentieth-century history and society of Indian subcontinent. Topics include nationalism, rural and urban life, popular culture, gender, and environmental politics. Offered: jointly with SISSA 316.

ANTH 317 Anthropology of Tibetan Civilization (5) I&S Introduces the basic features of Tibetan society and culture, exploring how the global debate over Tibet's past, present, and future relates to contemporary concerns in anthropology, through the examination of Tibetan history, social and political organization, religion, and other cultural themes in both traditional and contemporary contexts.

ANTH 318 Peoples and Cultures of the Islamic Middle East (3) I&S Survey of cultures and peoples of Islamic Middle East and North Africa. First half of the course emphasizes the integration of peasant, urban, and nomadic societies in the traditional culture and economy; the second half concentrates on the transformation of the traditional life styles through the process of westernization and modernization.

ANTH 320 Game Theory, Evolution, and Behavior (4) I&S, QSR Bergstrom, Smith Introduction to the logic and basic techniques of modern game theory, and exemplary applications to understand behavioral variation and social interaction in humans and other species. Emphasizes non-mathematical representations of fundamental concepts and processes, with

considerable use of computer-based exercises and experiments. Offered: jointly with BIOL 320.

ANTH 321 Comparative Religion (3) I&S Anthropological approaches to religious experience and belief with emphasis on conceptual issues such as ritual, symbolism, identify, ecstatic experience, and revitalization movements in the context of globalization. Also addresses the diversity of religious expression in American culture and how that compares with other societies. Offered: jointly with RELIG 321.

ANTH 322 Comparative Study of Death (5) I&S Death analyzed from a cross-cultural perspective. Topics include funerary practices, concepts of the soul and afterlife, cultural variations in grief, cemeteries as folk art, and medical and ethical issues in comparative context. American death practices compared to those of other cultures. Offered: jointly with RELIG 320.

ANTH 323 Human Rights Law in Culture and Practice (5) I&S Introduces the complexities of issues surrounding human rights. Examines human rights concerns through critical analyses, taking into account legal, social, economic, and historical variables. Offered: jointly with LSJ 321.

ANTH 324 Culture and Politics of Africa (5) I&S Hoffman Introduction to African cultural responses to the slave trade, European colonialism, and globalization. Topics include an examination of Euro-American representations of Africa and how they are often at odds with African realities.

ANTH 330 Religion, Identity, and Cultural Pluralism (5) I&S The role of religion in shaping personal and communal identity in a pluralistic society. Themes include current dimensions of American pluralism, effects of ethnicity, immigration, and electronic communication on building religious communities, and issues of conflict, violence, and reconciliation. Offered: jointly with RELIG 330.

ANTH 331 Native Art of the Pacific Northwest Coast (5) I&S/VLPA Survey of the indigenous arts of the Pacific Northwest Coast from the Columbia River in the south to Southeast Alaska in the north. Overview of ancient through contemporary times, focusing on the historical and cultural contexts of the arts and the stylistic differences between tribal and individual artists' styles. Offered: jointly with ART H 331.

ANTH 339 Social Movements in Contemporary India (5) Ramamurthy, Sivaramakrishnan Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with WOMEN 339/SISA 339.

ANTH 341 Political Violence and the Post-Colonial State in South Asia (5) I&S Examines theoretical approaches to the analysis of collective, state, and anti-state violence in post-colonial South Asia through the study of specific cases of political violence in modern India, Pakistan, Sri Lanka, and Nepal. Offered: jointly with SISSA 341.

ANTH 345 Women and International Economic Development (5) I&S Ramamurthy Questions how women are affected by economic development in Third World and celebrates redefinitions of what development means.

Theoretical perspectives and methods to interrogate gender and development policies introduced. Current processes of globalization and potential for changing gender and economic inequalities assessed. Offered: jointly with SIS 345/WOMEN 345.

ANTH 352 Buddhism and Society: The Theravada Buddhist Tradition in South and Southeast Asia (5) I&S Introduction to the religious tradition of Theravada Buddhism (as practiced in Sri Lanka, Burma, Thailand, Laos, and Cambodia) and examination of the variations in ethical orientations developed through Theravada Buddhist ideas. Recommended: RELIG 202 or one eastern religions course. Offered: jointly with RELIG 350.

ANTH 353 Anthropological Studies of Women (5) I&S Critical examination of the intersections between anthropology, research on gender issues, and feminism. Readings and class discussions examine the ways women have been represented in the field of anthropology and the repercussions of these anthropological images of women on contemporary understandings of gender. Offered: jointly with WOMEN 353.

ANTH 356 Visual Anthropology (3) I&S The place of photography and films in ethnography; their use in the documentation and interpretation of cultural and social systems.

ANTH 358 Culture and Cognition (5) I&S/NW Surveys anthropological theories and research on the relationship between language, thought, and behavior. Examines the influence of cultural inheritance on perception, classification, inference, and choice. Describes relevant cross-cultural research methods and evaluates theoretical models used by cognitive anthropologists. Prerequisite: either ANTH 203, LING 203, or PSYCH 355.

ANTH 359 Linguistic Ethnography (5) I&S Language use in cultural contexts. How language reflects world view. Language use in culturally significant settings. Analyzes sets of culturally specific terms in semantic domains. Includes projects demonstrating application of theory and method to data addressing specific problems. Workshop format.

ANTH 360 Anthropology of Popular Culture (5) I&S *Bilaniuk* Analysis of the forces that shape popular culture. Examination of the local meanings of global trends in music, clothing, and leisure activities through case studies around the world. Students learn ethnographic methods and conduct an original research project. Prerequisite: one 200-level ANTH course.

ANTH 362 Anthropology of Tourism (5) I&S *Kahn* Anthropological approaches to tourism. Debates about cultural encounters and cultural change, authenticity, economic development, social inequalities, identity, gender, ethnicity, nationality, and cultural representation. Prerequisite: one 200-level ANTH course.

ANTH 370 Han Chinese Society and Culture (5) I&S *Anagnost, Harrell* Themes in the society and culture of the Han Chinese people. Concepts of self; personal interaction; family, gender, and marriage; communities and the state; religion and ritual; class, social categories, and social mobility; culturalism, nationalism, and patriotism. Offered: jointly with SISEA 370.

ANTH 371 Anthropology of Development (5) I&S *Sivaramakrishnan* Development refers to

social, economic, cultural, political transformations viewed as progress. Studied from anthropological perspectives. Historical, social context for emergence of ideas of development. Role of development in promoting national cultures. Impact of development on individual citizenship, families, rural-urban relations, workers, business, environment. Prerequisite: one 200-level ANTH course. Offered: jointly with ENVIR 371.

ANTH 374 Narrative, Literature, and Medical Anthropology (5) I&S *Taylor* Introduces anthropological perspectives on the workings of narrative in illness, healing, and medicine. Considers writings in medical anthropology alongside other genres of writing about similar topics. Readings include memoirs and fiction as well as scholarly articles.

ANTH 375 Comparative Systems of Healing (3) I&S Introduction to the anthropological study of healing. Examines four healing traditions and addresses their similarities and differences. Includes anthropological theories of healing and religion.

ANTH 379 Prisons in Anthropological Perspective (5) I&S *Rhodes* An introduction to prisons from an anthropological point of view, with focus on prisons as total institutions. Topics include the experiences of prisoners and staff, prison history, issues of race and gender associated with incarceration, and the imprisonment of the mentally ill. Offered: jointly with LSJ 379.

ANTH 399 Junior Honors Seminar (5) I&S Teaches skills required to write senior honors thesis, including evaluation of academic and scientific writing, formulation of problem, collection of bibliographic and other resources, evaluation of research proposals, and research proposal preparation. Final product is a formal thesis prospectus.

ANTH 401 West African Societies (3) I&S Social and cultural features of coastal and interior West African societies, including the Western Sudan. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 402 Societies of Eastern and Southern Africa (5) I&S Historical background and contemporary life of cultural groups in eastern and southern Africa with special study of selected cases of political and economic organization and cultural change. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 404 South America (5) I&S Survey of anthropological research among the traditional peoples of South America. Historical background and contemporary life of cultural groups of the Amazonian Basin. Transformation of traditional life-styles through the process of European conquest and the aftermath of colonialism. Detailed study of selected societies. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 406 China's Environment (5) I&S/NW Analysis of contemporary environmental problems in China, including population, food, water supply, pollution, biodiversity, and environmental activism. Combines natural science and social science perspectives. Prerequisite: either ANTH 210, ENVIR 201, SIS 200, SIS 201, or SIS 202. Offered: jointly with SISEA 406.

ANTH 412 South Asian Social Structure (5) I&S Caste class, and community in modern India. Transitions from colonial typology to analysis of social change, diversity, stability, and caste hierarchy in rural society. Current debates on class and community in Indian society, rural and urban, explored through themes of identity, structure, and mobility. Prerequisite: one 200-level ANTH course. Offered: jointly with SISSA 412.

ANTH 416 Comparative Social Movements: Mexico and the United States (5) I&S *Pena* Historical, ethnographic, and theoretical perspectives in the study of Mexican-origin communities in social movements in Mexico and the United States with a focus on workers, immigrants, peasants, women, indigenous peoples, and students as forces of collective mobilization and social, cultural, and political change. Offered: jointly with CHSTU 416.

ANTH 418 Indian Heritage of Mexico and Central America (5) I&S Indian civilization of Mexico and Guatemala, their origins and ecological foundations. Contemporary communities of Mexico and Guatemala, focusing on creative adaptation of pre-Columbian traditions to modern national realities. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 420 Psychoanalysis and the Study of Culture (3) I&S *Spain* Anthropological use of theories developed by Freud to understand culture. Reviews psychoanalytic theory as a foundation for examining the work of Roheim, LaBarre, Devereaux, Kardiner, and Spiro, among others. Topics covered include the universality of oedipality and the utility of psychoanalysis in non-Western cultures.

ANTH 421 Belief, Ritual, and the Structure of Religion (5) I&S Systematic survey of concepts, models, and theories that characterize the anthropological study of religion. Consideration of the human universal basis of religion and of diverse ways in which religions are constructed and related to social experience. Prerequisite: either ANTH 321 or RELIG 201; RELIG 202.

ANTH 423 Traffic Across Cultural Boundaries (5) I&S Focuses on the movement of cultural patterns and processes across boundaries, examining the "contact zones" in colonial encounters, moving to borrowing and blendings along ethnic and national borders. Examines border crossing of immigration and diasporas. Ethnographic examples from the Americas and Africa. Prerequisite: one 200-level ANTH course.

ANTH 424 Hunter-Gatherer Societies (4) I&S Comparative examination of human foraging societies, emphasizing ethnographic cases and socioecological analysis. Foraging and human evolution; rationality of foraging societies; population and reproductive strategies; variability in social organization and land use; power relations between the sexes; ritual and belief; contemporary status of hunter-gatherer populations. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 425 Anthropology of the Post-Soviet States (5) I&S Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with SISRE 425.

ANTH 427 Anthropology in Urban Settings (3) I&S Cross-cultural examination of theoretical issues in anthropology as studied in urban places. Focuses on ethnic identity and the formation of urban ethnic groups; migration and its rural and urban consequences; family and kinship organization as an adaptation to urban complexity; the nature of urban voluntary associations; law and politics; and the developments in anthropological method. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 428 Anthropological Perspectives on Ethnicity (5) I&S Anthropological approaches to ethnicity and ethnic group relations with reference to other models including race, caste, class, regional groupings, nations, religion, and stratification. Data drawn from precolonial, colonial, and postcolonial periods. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 429 Expressive Culture (5) VLPA Anthropological view of one expressive aspect of culture: plastic and graphic arts, myth and folktale, music, dance, humor and tragedy, or play and games. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 430 The Anthropology of Music (3) I&S/ VLPA Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation, e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with MUSIC 480; alternate years.

ANTH 432 Sociolinguistics I (5) I&S/VLPA Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: either LING 200 or LING 400; recommended: prior or concurrent registration in ANTH 451 or LING 450. Offered: jointly with LING 432.

ANTH 433 Sociolinguistics II (3) I&S/VLPA *Wassink* Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of linguistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with LING 434.

ANTH 435 Economic Anthropology (5) I&S Chief features of nonmonetary and simple monetary economics. Impact of central or metropolitan market economy and industrial technology as peripheral systems, especially of small-scale and limited monetary circulation. Development and application in anthropology of economic concepts, including Marxian. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 436 Comparative Family Organization (5) I&S Function and structure of family developmental processes in band, tribal, peasant, and modern societies. Illustrates inter- and intrasocietal variation and provides data for construction of formal models of process and variation in family systems. Prerequisite: either one 200-level ANTH course, LING 203, or SOC 352.

ANTH 437 Political Anthropology and Social Change (5) I&S *Sivaramakrishnan* Study of politics from different anthropological perspectives, specially processual approaches to political change. Focused examination of cultural aspects of modern state formation in local and regional contexts. Themes: colonialism and nationalism, regime and transitions, local politics and global processes, social construction of bureaucracy. Prerequisite: one 200-level ANTH course.

ANTH 438 The Analysis of Kinship Systems (5) I&S Data, theories, and analytical technique used in the study of kinship systems, including our own, from around the world. Prerequisite: one 200-level ANTH course or LING 203.

ANTH 440 Child Rearing, Culture, and Health (3) I&S Cross-cultural study of the child-rearing practices, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used. Offered: jointly with NURS 495.

ANTH 441 Psychological Anthropology (5) I&S Assessment of mutual relevance of cultural and psychological variables in anthropology. Historical development of principal topics, e.g., cognition, national character, enculturation, personality and social change, cross-cultural psychiatry, sex and temperament, deviance, and psychoanalytic studies of culture. Prerequisite: either PSYCH 101 or PSYCH 205.

ANTH 444 Politics of Representation in Modern China (5) I&S Focuses on issues of representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with SISEA 444.

ANTH 445 Literature and Society in Southeast Asia (5, max. 10) I&S/VLPA Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with SISSE 445.

ANTH 446 Class and Culture in East Asia (5) I&S Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hierarchy, resistance, and the formation of class identity. Offered: jointly with SISEA 443.

ANTH 447 Anthropology of Chinese Religion (5) I&S Chinese religions, including folk, popular, and new religions, viewed from an anthropological perspective. Prerequisite: either ANTH 202, 204, 208, 321, 421, 370 or RELIG 202, or SISEA 370, 454.

ANTH 448 Modern Korean Society (5) I&S Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/ SISEA 212. Offered: jointly with SISEA 448.

ANTH 449 Social Transformation of Modern East Asia (5) I&S Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with SIS 449.

ANTH 450 Language and Gender (5) I&S, VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with WOMEN 450/LING 458.

ANTH 451 Comparative Historical and Social Ecology of the Tropics (5) I&S *Sivaramakrishnan* Historical and social aspects of tropical environmental change. Comparative analysis of resource management, conservation, and environmental regulation issues in Asia, Africa, and Latin America from cultural and political economic perspectives. Special focus on issues of state policy, expert knowledge, social conflict, and international politics. Prerequisite: ANTH 210. Offered: jointly with ENVIR 451.

ANTH 454 Women, Words, Music, and Change (5) I&S/VLPA Comparative analysis of use of myths, tales, music, and other forms of expressive culture to account for, reinforce, and change women's status and roles. Recommended: WOMEN 353. Offered: jointly with WOMEN 454.

ANTH 455 Areal Linguistics (3, max. 6) I&S/ VLPA Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Borrowing vocabulary specialization, lexical change, and language death and revival. Prerequisite: either LING 200, LING 201, ANTH/ LING 203, or LING 400. Offered: jointly with LING 455.

ANTH 456 Contemporary Ethnography (5) I&S Techniques and theories of ethnographic description for the anthropological analysis of contemporary life. Materials drawn from the contemporary United States, with a focus on issues and events in the Seattle area. Includes fieldwork projects. Prerequisite: either one 200-level ANTH course or LING 203.

ANTH 457 Ecological Anthropology (5) I&S Survey of anthropological research on interaction between human societies and their environments. Logic of different subsistence systems; intensification and transformation of subsistence strategies; population regulation; ecological aspects of human nutrition, disease, spatial organization, ethnicity, social stratification, conflict, and cooperation; historical roots of current ecological crisis.

ANTH 458 Ethnobiology: Plants, Animals, and People (5) I&S *Hunn* Culturally mediated relationships between human and natural environment studied in a comparative and evolutionary framework. How do peoples in diverse cultures recognize and name plants and animals and understand their relationship with nature? How is this traditional ecological knowledge applied in people's daily lives? Prerequisite: either BIO A 201, ARCHY 205, or one 200-level ANTH course.

ANTH 459 Culture, Ecology, and Politics (5) I&S *Pena* Critical studies of class, gender and race differences in environmental politics. The political-economic dimensions of ecological change. Contemporary environmental movements including the varieties of bioregionalism, deep ecology, ecofeminism, ecosocialism, environmental justice, and social ecology. Offered: jointly with ENVIR 459.

ANTH 460 History of Anthropology (5) I&S Sources and development of leading concepts, issues, and approaches in anthropology. Findings of anthropology in relation to scientific and humanistic implications and to practical application. Main contributors to field; their work and influence. Past, present, and future perspectives, including anthropology of modern life.

ANTH 464 Language Politics and Cultural Identity (3) I&S/VLPA *Bilaniuk* Theories and case studies of the power of language as how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with LING 433.

ANTH 465 Critical Anthropology of Mass Culture (5) I&S Critical overview of theories of mass culture and their relationship to current anthropological practice. Analyses of the historical interconnections among capitalism and commodity fetishism, modernity and representation, and media and consumption.

ANTH 466 Anthropology Honors Thesis ([1-9]-, max. 18) I&S Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

ANTH 467 Anthropology of Education (5) I&S Uses a wide range of social theory and philosophy to investigate mechanisms which reproduce inequality and asymmetry in American education.

ANTH 469 Special Studies in Anthropology (3-5, max. 15) I&S Delineation and analysis of a specific problem or related problems in anthropology. Offered occasionally by visitors or resident faculty.

ANTH 470 Minority Peoples of China (5) I&S Interaction between China and the peoples of its periphery, including inner Asia, Tibet, northern mainland Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: one 200-level ANTH course; LING 203; either ANTH/SISEA 370 or HSTAS 454. Offered: jointly with SISEA 470.

ANTH 471 Colonialism and Culture (5) I&S Explores the cultural, political, and historical implications of the power to colonize. Readings include ethnographic, historical, and literary works on colonialism, nationalist responses, and postcolonial positions.

ANTH 473 Anthropology of Science and Technology (5) I&S/NW *Lowe, Taylor* Introduces the study of science and technology as social and cultural phenomena. Considers both theoretical and methodological questions. Readings include key texts from interdisciplinary field of science studies as well as selected

ethnographic texts. Examples taken from U.S. society and other local contexts. Prerequisite: one 200-level ANTH course.

ANTH 474 Social Difference and Medical Knowledge (5) I&S *Taylor* Explores relations between medical and social categories: how social differences become medicalized; how medical conditions become associated with stigmatized social groups; and how categories become sources of identity and bases for political action. Considers classifications (race, gender, sexuality, disability) and how each has shaped and/or been shaped by medical science/practice.

ANTH 475 Perspectives in Medical Anthropology (5) I&S Introduction to medical anthropology. Explores the relationships among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with HSERV 475.

ANTH 476 Culture, Medicine, and the Body (5) I&S Explores the relationship between the body and society, with emphasis on the role of medicine as a mediator between them. Case study material, primarily from contemporary biomedicine, as well as critical, postmodern, and feminist approaches to the body introduced within a general comparative and anthropological framework.

ANTH 477 Medicine in America: Conflicts and Contradictions (3) I&S Introduction to the pragmatic and theoretical dilemmas of current biomedical practice with emphasis on social and cultural context. Case studies in technological intervention, risk management, and other health-related issues used to explore connections among patients' experiences, medical practices, and the contemporary social context.

ANTH 478 Introduction to the Anthropology of Institutions (5) I&S *Rhodes* Historical, theoretical, and ethnographic perspectives on the study of total institutions, with an emphasis on prisons and psychiatric facilities. Includes issues of subjection and subjectivity, institutional social dynamics, and social justice concerns.

ANTH 479 Advanced Topics in Medical Anthropology (3-5, max. 15) I&S *Chapman, Rhodes, Taylor* Explores theoretical and ethnographic advanced topics in medical anthropology. Prerequisite: permission of instructor.

ANTH 480 Introduction to Museology (3) I&S Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with MUSEUM 480.

ANTH 484 Motherhood: Ideologies and Technologies (5) I&S *Twine* Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with WOMEN 458.

ANTH 485 Cultural Property: Legal and Ethical Issues (3) I&S Examines the complex history of legal and ethical issues affecting the acquisition, ownership, and disposition of cultural property, with special attention to modern

indigenous peoples' requests for repatriation of collections from museums, as well as concerns with intellectual property rights, national patrimony policies, and related trade issues.

ANTH 486 Human Family Systems: Biological and Social Aspects (5) I&S Biological bases for human mating and reproduction and an examination of the range of cross-cultural variability in human systems of kinship and marriage; comparisons among a wide range of human and nonhuman species and between Western and non-Western human societies; interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with SOC 486.

ANTH 487 Cultures and Politics of Environmental Justice (5) I&S *Pena* Comparative survey of environmental justice movements in the world with focus on critical studies of environmental racism, risk, and sustainable development. Provides theoretical knowledge and research methods incorporating the study of equity and autonomy in environmental impact and risk assessment and other aspects of environmental policy politics. Offered: jointly with AES 487.

ANTH 488 Agroecology (5) I&S *Pena* Cross-cultural survey of agroecological research methods, theoretical problems, policy issues, and ethical debates. Local knowledge and ethnoscientific bases of alternative agriculture. Comparative political ecology of agroecosystems with a focus on indicators of social equity and ecological sustainability.

ANTH 489 Anthropology Practicum (2-9, max. 15) I&S Faculty-supervised internships, either on or off campus, in organizations utilizing anthropological skills in nonacademic settings. Settings may include museums, academic journals, social service or other governmental agencies, and private nonprofit service agencies.

ANTH 491 Honors Colloquium (2, max. 12) I&S Introduction to anthropological research. Students read original articles and papers and discuss them with authors. Research presenters include department faculty, visiting faculty, and advanced graduate students. Credit/no credit only.

ANTH 495 Advanced Problems in Ethnology (3-5, max. 10) I&S Current problems in ethnology. Seminar format.

ANTH 497 Domesticating International Human Rights: Perspectives on U.S. Asylum and Refugee Law (5) I&S Examines the creation, production, and proliferation of law and legal categories relating to the status of refugees and asylum-seekers in the United States. Integrates anthropological perspectives of law's ability to create meaning in the examination of deeper implications of asylum and refugee law in American society. Offered: jointly with LSJ 425.

ANTH 498 Women's Rights and Politics in Islamic Society (5) I&S Human rights theory with women's legal rights and practice within context of the Islamic state. Introduction to debates regarding universality of human rights through examination of women's rights in Muslim context. Considers journalistic notions of homogeneity among Muslims, political nature of the Islamic state, and its mobilization of human rights. Offered: jointly with LSJ 421.

ANTH 499 Undergraduate Research (*, max. 12).

ANTH 500 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the analysis and comparison of social and cultural systems. Not open to graduate students in the sociocultural anthropology program.

ANTH 503 Preceptorial Reading in Linguistic Anthropology (6) For beginning graduate students who have not had prior training in the problems, principles, and methods involved in linguistic anthropology. See also course description for 203. Not open to graduate students in the linguistics program.

ANTH 507 Current Issues in Sociocultural Anthropology (2-) Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH 508 Current Issues in Sociocultural Anthropology (-2) Biweekly presentations by participants and guest lecturers of current literature and ongoing research in topics pertaining to social, cultural, and linguistic anthropology. Credit/no credit only. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH 509 Sociocultural Anthropology Problem Paper (4) All first-year graduate students in sociocultural anthropology select a topic for independent research, conduct that research, and prepare a paper of about 25-50 pages on the topic chosen. Prerequisite: first-year sociocultural graduate students in good standing or permission of sociocultural faculty.

ANTH 510 Seminar on North American Indians (3) Advanced comparative treatment of selected aspects of the Indian cultures and societies of North America.

ANTH 514 Regional Seminar (3-5, max. 15) Comparative treatment of selected aspects of cultures and societies of a particular region or area.

ANTH 517 Seminar on South Asia (3) Advanced analysis of selected problems in South Asian ethnology and social structure. Prerequisite: ANTH 412.

ANTH 521 Seminar on the Anthropological Study of Religion (3, max. 9) Advanced seminar in the anthropological study of religion designed for students who have a background in the theory and applications of theory developed in the anthropological study of religion. Seminar topics vary each quarter. Prerequisite: ANTH 422 and graduate standing; permission of instructor for graduate students in Comparative Religion.

ANTH 525 Seminar in Culture Processes (3, max. 6) The concept of process and its application to the study of culture.

ANTH 527 Ethnicities, Nations, and Cultural Identities (3) Exploration of how cultural differences have been represented in ethnic and national narratives and how these narratives have shaped identities and social relations.

ANTH 533 Law, Liberalism, and Modernity (5) Examines relationships between law, culture, and power through post-structuralist theories that consider subjectivity, agency, and identity. Explores connections between modern liberal law and the body, possessive individualisms, and discourses of rights. Topics include rights-talk, globalization, biopolitics, subject-making, modern nation-states, the rule of law, neo-liberalism, and legal cultures.

ANTH 535 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Credit/no credit only. Offered: AWP.

ANTH 536 Seminar in Visual Anthropology (3) Significance of anthropological cinema and photography placed in historical perspective. Screening of films to determine the role of the anthropologist as filmmaker, as well as the role of the filmmaker as anthropologist.

ANTH 537 Political Anthropology and Law (3, max. 6) Seminar on special topics in politics and law and their interrelationships.

ANTH 538 Politics of Representation (3) Representations of power and the powers of representation. Critical approaches to representation in colonial and postcolonial worlds. Divine kings, exemplary centers, the New World Order, voting subjects, and the possibilities of transgression.

ANTH 539 Social Movements in Contemporary India (5) *Ramamurthy, Sivaramakrishnan* Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with SISSA 539/WOMEN 539.

ANTH 541 Cultural Aspects of International Development (3) *Sivaramakrishnan* Emergence of development as an aspect of late colonialism and the decolonization process. Ways in which development came to visualize social change in sectoral terms like rural land use, cities, and education, while objectifying people in target groups. Relationships between development and modernity, and development and globalization.

ANTH 542 Seminar in Cognitive Anthropology (3) Examines the intellectual history of cognitive anthropology; assesses its major findings in kinship, folk biology, color classification, and decision and planning theory. Replicates key studies, using cognitive anthropological methods. Evaluates influences from linguistics, psychology, and artificial intelligence research. Practical applications and future prospects.

ANTH 550 Field Techniques in Ethnography (5) Techniques of collecting, ordering, and utilizing ethnographic data in the field. Problems of rapport, elicitation, observation, interpretation, and ethics. Credit/no credit only.

ANTH 551 Research Design (3) Principles of research design, including problem delineation and selection of appropriate methods, as applied to current issues in sociocultural anthropology. Prerequisite: permission of instructor.

ANTH 552 Practicum in Ethnographic Research (3) Techniques of data recording, analysis, and writing for the field ethnographer. Not recommended for non-anthropology graduate students. Prerequisite: ANTH 550 and ANTH 551.

ANTH 553 Analysis of Linguistic Structures (3, max. 6) Syntactic, semantic, or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with LING 553.

ANTH 555 Discourses in Feminist Anthropology Seminar (5) *Jacobs* Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with WOMEN 553.

ANTH 556 The Evolution of the Family (3) Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with SOC 556.

ANTH 559 Seminar in Language and Culture (3, max. 9) Theoretical and methodological problems in language and culture.

ANTH 560 Discourse and Culture (5) Exploration of discourse and narrative as culturally constitutive activities. Critical examination of the social implications of cultural variation in discourse. Techniques of discourse analysis in anthropological research.

ANTH 561 Seminar in Methods and Theories (3, max. 9) .

ANTH 562 Clinically Applied Anthropology (3) Anthropology as it relates to interdisciplinary delivery of health care. Cultural variation in illness beliefs and behavior, types of healing practice, illness prevention, and social support networks. Prerequisite: graduate standing and permission of instructor. Offered: jointly with NURS 562.

ANTH 565 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: graduate standing in anthropology or permission of instructor.

ANTH 566 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 565.

ANTH 567 Theory of Sociocultural Anthropology (5) Core course sequence for the beginning graduate student in sociocultural anthropology in which the development of theory is analyzed and emphasis is placed on the relation between theory and a growing body of ethnographic data. Prerequisite: ANTH 566.

ANTH 570 Environmental Anthropology (5) Current issues in the study of human environmental interaction from a cross-cultural perspective: ecological adaptation and maladaptation; ethnoecology and indigenous knowledge; anthropogenic environmental change; political ecology of "development;" interrelations of cultural and biological diversity; conflicts over indigenous land use and property rights, environmental justice, resource conservation, and sustainability.

ANTH 572 Environmental Anthropology Research Methodology Colloquium (2, max. 10) Environmental anthropology research methodology and practice. Presentations by faculty and advanced students, hands-on exercises, and extensive discussion. Students at various stages in the program learn practical details of current methods. Limited to environmental anthropology PhD students. Credit/no credit only.

ANTH 573 Current Issues in Environmental Anthropology (2, max. 10) Presentation and discussion of current research and scholarly literature in environmental anthropology and related fields. Credit/no credit only. Prerequisite: graduate standing in any field of anthropology or permission of instructor.

ANTH 574 Socio-Cultural Perspectives of Public Health Genetics (3) Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with NURS 582/PHG 521.

ANTH 575 Cultural Construction of Illness: Seminar in Medical Anthropology (5) Historical and comparative examination of depression, neurasthenia, somatization, hypochondriasis, and hysteria. Anthropology of psychosomatics and psychiatry, including cultural analysis of selected biomedical, indigenous folk medical, and popular common-sense conceptualizations of illness.

ANTH 578 Special Topics in the Anthropology of Institutions (5) Explores theoretical issues.

ANTH 580 Presenting Research Effectively (2) Designed to help advanced graduate students develop the ability to present research projects effectively in a variety of formats relevant to the academic job-search process (c.v., job letter, interview, etc). Faculty and alumni speakers share information, advice, and guidance regarding the job-search and the various paths toward meaningful employment.

ANTH 581 Dissertation Writing (3) Students experiment with different styles of anthropological writing. They apply writing techniques and styles to their own material. Students peer review for one another. Credit/no credit only.

ANTH 584 Ways of Speaking (5) Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned styles of communicative conduct. Offered: jointly with COM 584.

ANTH 599 Effective Teaching of Anthropology (1) Class required of all graduate students who accept teaching assistantships: instruction in teaching methods and issues, e.g., professional ethics, preparing and delivering lectures, leading

discussion groups, test writing and grading, diversity in the classroom. Credit/no credit only.

ANTH 600 Independent Study or Research (*)

ANTH 700 Master's Thesis (*) Credit/no credit only.

ANTH 800 Doctoral Dissertation (*) Credit/no credit only.

Archaeology

ARCHY 105 World Prehistory (5) I&S Prehistoric human ancestors from three million years ago: their spread from Africa and Asia into the Americas, survival during ice ages, development of civilizations. Well-known archaeological finds, e.g., Olduvai Gorge; Neanderthals; Jericho; Egyptian pyramids; Mexican temples; Mesa Verde; Ozette, Washington. May not be counted toward the 55 credits required for the major in anthropology.

ARCHY 205 Principles of Archaeology (5) I&S Techniques, methods, and goals of archaeological research. Excavation and dating of archaeological materials. General problems encountered in explaining archaeological phenomena. Offered: AWSpS.

ARCHY 212 The Archaeology of Egypt (5) I&S *Wenke* A survey of ancient Egyptian culture history between about 6000 BC and AD 400, based on a synthesis of archaeological and textual evidence. Focuses on the origins and evolution of the Egyptian state and the elements of pharaonic religion, society, economy, art, architecture, and science.

ARCHY 270 Field Course in Archaeology (12) I&S Introduction to field acquisition of archaeological data through survey and excavation. Ongoing field projects; recovery and recording techniques. Offered: S.

ARCHY 272 Short Field Course in Archaeology (5) Fitzhugh, Grayson, Lape, Stein Learn how archaeologists detect human occupation on the landscape by surveying, excavating, and crating evidence of the past. Students learn from start to finish the process of archaeological field investigation. The location for this course may change from year to year. Recommended: ARCHY 205. Offered: A.

ARCHY 299 Archaeological Laboratory Techniques (1-3, max. 12) I&S Laboratory procedures geared to one specific archaeological research project. Archaeological collection, its processing and curation, how archaeological materials are processed, and how significance is determined. No more than 5 credits may be used toward an anthropology major. Prerequisite: either ARCHY 105 or ARCHY 205.

ARCHY 303 Old World Prehistory (5) I&S Old World prehistory from beginnings of human culture to rise of civilizations. First tools made by humans, spread of humans out of Africa, origins of agriculture, rise of state society. Africa, Near East, Egypt, China, India, Europe.

ARCHY 304 New World Prehistory (5) I&S History of earliest Americans, beginning with crossing of land bridge between Asia and North America and eventual spread over the Americas. Highlights prehistory and best examples of western hemisphere's civilizations. Mexico, Yucatan, Peru, southwestern and eastern United States, Washington.

ARCHY 320 Prehistory of the Northwest Coast (5) I&S Origins, development, and variation of Pacific Northwest cultures, focusing particularly on Washington. Adaptations to maritime and interior environments. Artifacts from a variety of archaeological sites. Technological, functional, and historical significance of Northwest artifacts.

ARCHY 325 Archaeology of Island Southeast Asia and the Pacific (5) I&S History of the human occupation of the South Pacific Islands, especially Indonesia, Philippines, Micronesia, Melanesia, and Polynesia. Focus on current debates about human migrations, long distance maritime trade, political structures, culture contact, and colonialism. Emphasis on the analysis of the primary archaeological and documentary data. Prerequisite: ARCHY 205.

ARCHY 371 Analysis of Archaeological Data (5) I&S Analyzing archaeological data by measuring and describing such artifacts as stone tools and ceramics. Analysis of such environmental data as bones, plant remains, and sediments. Prerequisite: ARCHY 205.

ARCHY 401 Archaeology of Human Origins (5) I&S *Close* Early part of the prehistoric archaeological record in Africa and Eurasia, from >2,000,000 years ago until the spread of modern human beings; development of stone and bone technologies; ways of making a living; cultural adaptations; intellectual and social development. Prerequisite: ARCHY 205. Offered: Sp.

ARCHY 402 Archaeology and Social Difference (5) I&S *Close* Examines case studies in prehistoric archaeological record for intersections of socially constructed differences including age, gender, and class. Contrasts past perceptions of difference with projection of modern differences backward to validate the present. Prerequisite: ARCHY 205; either ARCHY 105, ARCHY 303, or ARCHY 401.

ARCHY 403 The Archaeology of Landscapes (5) I&S/NW *Llobera* Study of landscapes in archaeology. Methods for landscape research: historic maps, diaries, aerial photographs, geophysical and satellite imagery, etc. Archaeological landscape surveys: principles and limitations. Review of various theoretical approaches. Examination of key case studies, Issues on landscape heritage and indigenous landscapes. Prerequisite: ARCH 205.

ARCHY 465 Public Archaeology (5) I&S Examines archaeology as practiced, regulated, represented, and paid for in the world outside of academia. Reviews the development of cultural resource management laws in the context of other social changes, investigates archaeology job opportunities outside of academia, and discusses how the public learns about and funds archaeology. Prerequisite: ARCHY 205.

ARCHY 466 Archaeology Honors Thesis ([1-9]-, max. 18) I&S Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

ARCHY 468 Issues in Cultural Resource Management (1) I&S Review of federal and state cultural resource management policies and the effects of these policies on the conduct of projects that may impact cultural resources on public lands. Survey of related issues in museum management. Credit/no credit only. Prerequisite: ARCHY 205; either one 200-level ANTH course or LING 203.

ARCHY 469 Special Studies in Archaeology (3-6, max. 18) I&S Consideration in detail of specific archaeological topics, either methodological or substantive in content, of current interest. Offered occasionally by resident, new, or visiting faculty. For advanced undergraduates and graduate students. Prerequisite: ARCHY 205.

ARCHY 470 The Archaeology of Extinction (5) I&S *Grayson* Uses archaeological and paleoecological data to examine the argument that prehistoric peoples caused vertebrate extinction, from the late Ice Age extinction of ground sloths and saber-toothed cats in North America to the extinction of moas in New Zealand some 500 years ago. Offered: even years; A.

ARCHY 475 Maya Prehistory (3) I&S Considers prehistoric cultural developments throughout the Central American region occupied by the prehistoric Maya. Temporal focus spans the late Preclassic, Classic, and Postclassic periods, from 300 BC to 1530 AD. Contrasts traditional and contemporary models of ancient Maya civilization. Prerequisite: ARCHY 205; ARCHY 304.

ARCHY 476 New World States and Empires (5) I&S Considers theoretical and methodological scholarship on complex societies in Meso-America and the Andes. Highlights current research on population dynamics, subsistence strategies, economic foundations, and political processes in the development of states and empires. Considers archaeological evidence and texts of native and European documents. Prerequisite: ARCHY 205; ARCHY 304.

ARCHY 477 Archaeology of the North (5) I&S *Fitzhugh* Archaeological history of the circumpolar arctic and subarctic from Pleistocene to the 19th century. Variability in human adaptation and social evolution in some of the world's most extreme environments such as Eurasian tundra, North Pacific rim, Beringia, and North American high arctic. Prerequisite: ARCHY 205. Offered: Sp.

ARCHY 478 Prehistory of the Arid West (5) I&S Archaeology of arid western North America, with particular emphasis on the earliest peoples of this region (and on the peopling of the New World in general), and on the prehistoric hunter-gatherers of the Great Basin and Southwest. Prerequisite: ARCHY 205.

ARCHY 479 Prehistoric Cultures of North America: Eastern North America (5) I&S Ecological and evolutionary account of prehistoric cultural developments in North America east of the Rocky Mountains. Cultural and environmental change from appearance of people in New World to collapse of indigenous cultural systems. Prerequisite: ARCHY 304.

ARCHY 480 Advanced Archaeological Analysis: Ceramics (6) I&S Human technology in traditional societies. Ceramic tools as evidence for technological innovation, continuity, and change; and as evidence for ancient economic systems involving production, consumption, and distribution. Examines variety of approaches to the study of material culture — especially ceramics — including archaeological, ethnographic, experimental, and technical. Prerequisite: ARCHY 371.

ARCHY 481 Advanced Archaeological Analysis: Faunal Remains (6) I&S Seminar on

techniques and methods employed in analysis of faunal remains from a wide range of Pleistocene and Holocene settings, including archaeological sites, coupled with a laboratory focusing on identification of faunal remains from these settings. Prerequisite: ARCHY 205.

ARCHY 482 Advanced Archaeological Analysis: Geoarchaeology (6) I&S Identification, analysis, and interpretation of sediments and soils associated with archaeological remains. Laboratories deal with sediment description and chemical analysis; field trips and student projects focus on archaeological applications of these subjects.

ARCHY 483 Analyses of Stone Artifacts (6) I&S *Close* Current approaches to lithic analysis, including types of information obtainable (technological, functional, social, ideological) and constraints affecting the formation and analysis of lithic assemblages. Lectures interspersed with application of methods under discussion to individual artifacts and to assemblages. Prerequisite: ARCHY 371.

ARCHY 489 Archaeology Practicum (2-9, max. 15) I&S Faculty-supervised internships either on or off campus in organizations utilizing archaeological skills in academic or non-academic settings. Includes cultural resource management companies, government agencies, private non-profit organizations, tribal governments, and museums.

ARCHY 495 Quantitative Archaeological Analytic Techniques (5) I&S Introduction to quantitative approaches to archaeological problems; data screening, numeric methods of classification and identification, graphical and computer-based seriation techniques, and the analysis of spatial patterning in artifact distributions.

ARCHY 497 Archaeological Method and Theory I: Formal Theory (5) I&S Examination of theoretical constructs in the analysis of archaeological data. Terminology, typologies, and interregional comparisons. Prerequisite: ARCHY 205.

ARCHY 498 Archaeological Method and Theory II: Explanatory Theory (5) I&S Conceptual frameworks employed by archaeologists in obtaining explanation in the three major areas of culture history, cultural reconstruction, and explanatory prehistory, considering the nature of explanation as conceived in these areas, the basic assumptions employed in achieving these aims, and an introduction to the methods employed. Prerequisite: ARCHY 205; ARCHY 497.

ARCHY 499 Undergraduate Research (*, max. 12) .

ARCHY 501 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the problems, principles, and methods involved in the reconstruction of prehistory. Not open to graduate students in the archaeology program.

ARCHY 520 Principles of Archaeological Theory (5) Review of principles of archaeological theory. Student presentation of research on archaeological theory and seminar discussion or presentations. Open only to first-year graduate students in anthropology.

ARCHY 525 Archaeology of Island Southeast Asia and the Pacific (5) History of the human occupation of the South Pacific Islands, especially Indonesia, Philippines, Micronesia, Melanesia, and Polynesia. Focus on current debates about human migrations, long distance maritime trade, political structure, culture contact, and colonialism. Emphasis on the analysis of the primary archaeological and documentary data. .

ARCHY 530 Prehistory of the Northwest Coast (5) Origins, development, and variation of Pacific Northwest cultures, focusing particularly on Washington. Adaptations to maritime and interior environments. Artifacts from a variety of archaeological sites. Technological, functional, and historical significance of Northwest artifacts.

ARCHY 560 Seminar in Archaeological Methods (5, max. 20) Basis, limitations, and applications of a particular archaeological analytical method, or closely related set of methods. Prerequisite: permission of instructor.

ARCHY 561 Dating Methods in Archaeology (6) *Feathers* Theory and method of dating in archaeology. How archaeologists determine time, in both relative and absolute senses. Methodology of stratigraphy, seriation, radiocarbon dating, dendrochronology, obsidian hydration dating and other methods. Special emphasis on, and laboratory experience in, luminescence dating.

ARCHY 570 Seminar in Archaeological Theory (3-6, max. 18) Detailed consideration of a particular archaeological theory or closely related set of theories, including their methodological and epistemological bases. Prerequisite: ARCHY 497, ARCHY 498.

ARCHY 571 Field Course in Archaeology (5) Introduction to field acquisition of archaeological data through survey and excavation. Ongoing field projects: instructional emphasis on recovery and recording techniques and on management of field projects. Prerequisite: permission of department.

ARCHY 572 Seminar in North American Archaeology (3, max. 6) Selected problems in the archaeology of America north of Mexico. Prerequisite: permission of instructor.

ARCHY 574 Meta-archaeology: Philosophy and Archaeology (4) *Wylie* Examines philosophical issues raised in and by archaeology, including theories of explanation and model building, analyses of evidential reasoning and hermeneutic interpretation, debates about ideals of objectivity and about science and values. Recommended: ARCHY 570 Text Offered: jointly with PHIL 574; Sp.

ARCHY 575 Archaeological Field Research Design (6) Nature of the archaeological record, and methods and techniques of field research, to illustrate range of data sources and modern techniques of general applicability. Practical experience in mapping, map interpretation, sampling design, remote sensing, photogrammetry, and research proposal writing. Prerequisite: permission of instructor.

ARCHY 576 Designing Grant Proposals (5) Design and writing of grant proposals for archaeological research at both dissertation and senior investigator levels, with particular emphasis on National Science Foundation structure and requirements. Prerequisite: upper-level graduate standing and permission of instructor.

ARCHY 591 Advanced Field Course in Archaeology (6-9) For students with previous field experience and graduate work in archaeology. Emphasis on decision making in field and project management. Prerequisite: ARCHY 497, ARCHY 498, ARCHY 571, and ARCHY 575 or permission of instructor.

ARCHY 600 Independent Study or Research (*) Prerequisite: permission of instructor.

ARCHY 601 Internship (3-10, max. 10) Credit/no credit only.

Biocultural Anthropology

BIO A 100 Evolution and Human Behavior (3) NW Introduction to evolution by natural selection, examining the light it can throw on human biology and behavior in such areas as the nature of sex differences, sexual conflict, and conflict between parents and children. Does not fulfill major requirements. Offered: jointly with BIOL 108.

BIO A 101 Human Biological Diversity (5) NW Kramer Exploration of human biological variation, including skin color, body form, blood groups, genetics, and reproductive strategies. Introduction to the theory of evolution through natural selection. Offered: A.

BIO A 201 Principles of Biological Anthropology (5) NW Evolution and adaptation of the human species. Evidence from fossil record and living populations of monkeys, apes, and humans. Interrelationships between human physical and cultural variation and environment; role of natural selection in shaping our evolutionary past, present, and future. Offered: AWPpS.

BIO A 370 Introduction to Primates (5) NW Newell Origins, major evolutionary trends, and modern taxonomic relationships of the nonhuman primates. Their distribution and habitat in relation to behavioral and morphological adaptations and their status as endangered species. Prerequisite: BIO A 201. Offered: A.

BIO A 372 Uses and Abuses of Evolutionary Views of Human Behavior (5) I&S/NW Newell Interaction of human behavior and biology as it has been interpreted within an evolutionary framework. Discusses various challenges to Darwinian theory, particularly Lamarckism and creationism. Topics include biological determinism as exemplified by racism, myths of human origins, the clash between biological and cultural determinism, and modern genetics and behavior.

BIO A 382 Human Population Biology (3) NW Human population biology with reference to capacity for growth in population size. Interaction of human biology, population structure, and culture in promoting such growth. Effects of economic, demographic, medical, and ecological factors. Prerequisite: either BIO A 201, BIOL 101, BIOL 180, or BIOL 201.

BIO A 387 Ecological Perspectives on Environmental Stress, Adaptation, and Health (5) NW Leonetti How human populations respond to environmental stressors in biological-behavioral terms and the relationship of this adaptational process to health. Nutritional, climatic, and sociocultural stress and associated patterns of birth, disease, and death throughout human history in hunting, gathering, farming, pre-industrial, and industrial societies. Prerequisite: BIO A 201.

BIO A 388 Human Fossils and Evolution (5-) NW Eck First of a two-part series. Evolution of human anatomy and behavior as adaptations to changing environments. Human fossils: their geological context, age, ecological setting used to reconstruct the evolution of our species during the last six million years of earth history. Prerequisite: either BIO A 201, or BIOL 201 and BIOL 202 and BIOL 203, or BIOL 102, or BIOL 180 and BIOL 200. Offered: W.

BIO A 389 Human Fossils and Evolution (-5) NW Eck Second of two-part series. Evolution of human anatomy and behavior as adaptations to changing environments. Human fossils: their geological context, age, ecological setting used to reconstruct the evolution of our species during the last six million years of earth history. Prerequisite: BIO A 388. Offered: S.

BIO A 450 Biodemography Seminar (5) I&S/NW Introduction to theory, methods, and literature of biodemography. Examines biological mechanisms underlying patterns of aging, mortality, fertility, and population growth and decline. Includes readings from anthropology, sociology, demography, evolutionary biology, molecular biology, and epidemiology. Covers prehistoric, historic, and modern human populations, and non-human model systems. Offered: W.

BIO A 455 Reproductive Ecology Laboratory Seminar (5) NW Introduction to the theory and methods of laboratory-based research in reproductive ecology. Covers lab methods for reproductive hormone assays, and their application in anthropological, biodemographic, and epidemiological research. Prerequisite: BIO A 201. Offered: Sp.

BIO A 465 Nutritional Anthropology (3) I&S/NW Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with NUTR 465.

BIO A 466 Biocultural Anthropology Honors Thesis ([1-9]-, max. 18) NW Individual research under the direction of a thesis advisor, culminating in a senior honors thesis. Open only to upper-class students in departmental honors program.

BIO A 469 Special Topics in Biocultural Anthropology (3-5, max. 15) NW Delineation and analysis of a specific problem or a more general area in biocultural anthropology. Offered occasionally by visiting or resident faculty.

BIO A 470 Evolution of Human Social Behavior (5) I&S,QSR Smith Key concepts, research strategies, and debates concerning the processes and outcomes of human behavioral evolution. Emphasizes the complementarity of various methods and theories for understanding human biocultural evolution, including behavioral ecology, dual transmission theory, phylogenetic analysis, and evolutionary psychology. Prerequisite: BIO A 201.

BIO A 473 Biological Adaptability of Human Populations (5) NW Shell-Duncan Mechanisms enabling humans to maintain homeostasis in extreme environments: high altitude, heat, cold, nutritional deficiency, radiation. Adaptive process

operating at levels of physiology, metabolism, and population, including the strategies of fertility and birth spacing. Prerequisite: BIO A 201.

BIO A 475 Environmental Impacts of Small Scale Societies (5) I&S/NW Grayson, Smith Examines the environmental impacts (positive and negative) among prehistoric and historic/ethnographic small-scale (hunter-gatherer and horticultural) societies worldwide, and debates these impacts, within a theoretical framework provided by evolutionary ecology and biogeography. Offered: jointly with ENVIR 475.

BIO A 476 Sociocultural Ecology and Health (3) NW Leonetti Sociocultural ecology of health/disease, focusing on humans as bioculturally integrated beings and on populations as biocultural units of adaptation. Examples of research on disease, both infectious and chronic, and patterns of morbidity and mortality, infant, maternal, old age, with particular attention to situations of sociocultural changes. Prerequisite: BIO A 201.

BIO A 477 Evolutionary Perspectives on Sex and Gender Roles (3) I&S/NW Critical examination of theories explaining the evolution of sex differences and associated gender roles. Consideration of gender differences in mate preferences, parental investment, subsistence, aggressiveness, and risk-taking. Stresses interactions between biology and culture. Prerequisite: BIO A 201.

BIO A 482 Human Population Genetics (5) NW, QSR Holman Micro-evolutionary changes in human populations. Effects of mutation, selection, inbreeding, gene flow, and genetic drift as causes of evolutionary change. Mathematics beyond high school not required. Prerequisite: BIO A 201.

BIO A 483 Human Genetics, Disease, and Culture (5) NW Considers relationships among genetic aspects of human disease, cultural behavior, and natural habitat for a wide variety of conditions. Also considers issues of biological versus environmental determinism, adaptive aspects of genetic disease, and the role of cultural selection. Prerequisite: BIO A 201.

BIO A 484 Human Life Cycle (5) NW Newell Human growth and physical/social development: fetal life to old age. Cultural, ecological, and evolutionary aspects of the life cycle. Population differences in age and sex related to morbidity and mortality. Prerequisite: BIO A 201.

BIO A 485 Research in Growth and Development (2, max. 8) NW Focus on topics relating to primate growth and development. Prerequisite: either BIO A 484, BIO A 495, or BIO A 496, any of which may be taken concurrently.

BIO A 486 Primate Socioecology (3) NW Focus on the variety of social systems exhibited by nonhuman primates and adaptive significance of these societies; social systems in terms of the present ecology and evolutionary past of the species; the function of communicatory gestures and vocalizations, tradition, kinship, and social roles in maintaining and structuring groups over generations; the relationship among mating systems, foraging strategies, ranging patterns, and ecological separation/resource partitioning and their contribution to species-typical social organization. Prerequisite: either BIO A 370 or PSYCH 418.

BIO A 487 Human and Comparative Osteology (3) NW Introduction to the vertebrate skeleton.

The skeleton is described in detail and various methods of determining age and sex, as well as osteometry and modern statistical methods for handling such data, are presented.

BIO A 488 Primate Evolution (5) NW *Eck* Major trends in nonhominid primate evolution through the Cenozoic. Discussion of the specimens, geological context, and age of the fossil taxa and their relationship to modern taxa. Practical experience in analyzing fossil material. Prerequisite: BIO A 201.

BIO A 491 Issues in Human Paleontology (5) NW *Eck* Addresses five major unanswered questions concerning human evolution as represented by the fossil record. Prerequisite: BIO A 389.

BIO A 495 Growth and Development: Infancy (5) NW *Newell* Genetic and environmental influences on growth and development from prenatal life through infancy. Includes exploration of methods for assessing development and comparisons of development in non-human primates with human development. Prerequisite: BIO A 370.

BIO A 496 Growth and Development: Adolescence and Reproductive Maturity (5) NW *Newell* Genetic and environmental influences on growth and development during adolescence. Emphasis on the interaction of biological and social factors in attainment of reproductive maturity. Compares conditions of non-human primates with human conditions. Prerequisite: BIO A 370.

BIO A 499 Undergraduate Research (*, max. 12) .

BIO A 502 Preceptorial Reading (6) For beginning graduate students who have not had adequate training in the study of primate principles and methods involved in the study of evolution, human genetics, and the evolution of modern populations. Not open to graduate students in the biocultural anthropology program. Offered: AWS.

BIO A 520 Human Behavioral Ecology (3-5) *Smith* Principles and methods of evolutionary behavioral ecology, and critical examination of their application to human behavior in such areas as resource utilization, mating, parenting, life history, cooperation, and competition.

BIO A 525 Biocultural Research Methods and Study Design (5) *Shell-Duncan* Survey of basic conceptual issues in the design of empirical research, with special attention to problems that arise during anthropological fieldwork. Topics include defining data needs, sampling strategies, problems with co-funding, proposal writing, human subjects approval, and basic ethical issues in human biocultural research.

BIO A 526 Quantitative Methods and Modeling for Biocultural Anthropology (5) Surveys the concepts, tools, and methods for developing quantitative models based on underlying biocultural processes. Introduces methods of testing models from observations collected in anthropological field studies. Oriented toward longitudinal research of fertility, mortality, disease dynamics, population genetics, and other biocultural processes.

BIO A 550 Skeletal Biology and Prehistoric Demography (5) *O'Connor* Composition and structure of calcified tissue. Analytical

techniques and their contribution to interpretation of the archaeological record.

BIO A 568 Human Reproductive Ecology (3) A consideration of the determinants of fertility variation within and among traditional human societies. Biocultural and ecological perspectives on pubertal timing, nuptiality, duration of birth intervals, and reproductive senescence.

BIO A 569 Demographic Analysis in Biological and Social Anthropology (5) *Leonetti* Demographic analysis relevant to anthropological research on small populations. Use of data collected through local surveys, genealogical methods, and from other sources. Focuses on use of demography to analyze social and biological processes with adaptive and/or cultural-historical significance. Theoretical approaches emphasized.

BIO A 584 Topics in Ecology and Adaptation (3, max. 9) Seminar dealing with various aspects of ecology and adaptation. Topics vary each quarter.

BIO A 588 Topics in Primate Evolution (3) Emphasis on fossil taxa and their importance in understanding the morphologies and distributions of members of modern taxa. Prerequisite: BIO A 488 and permission of instructor.

BIO A 590 Current Issues in Human and Non-Human Primate Evolution (2, max. 18) Biweekly presentation by participants and guest lecturers of current literature and ongoing research in topics pertaining to human and nonhuman primate evolution, biology, anatomy, genetics variation, and behavior. Credit/no credit only.

BIO A 600 Independent Study or Research (*)

Applied Mathematics

AMATH 301 Beginning Scientific Computing (3) NW Introduction to the use of computers to solve problems arising in the physical, biological and engineering sciences. Application of mathematical judgment in selecting tools to solve problems and to communicate results. Introduction to basic MATLAB routines for numerical computation. Prerequisite: either MATH 126, Q SCI 293, MATH 129, or MATH 136; recommended: either CSE 142 or ENGR 142. Offered: AWSpS.

AMATH 351 Introduction to Differential Equations and Applications (3) NW Introductory survey of ordinary differential equations. Linear and nonlinear equations. Taylor series. Laplace transforms. Emphasis on formulation, solution, and interpretation of results. Examples from physical and biological sciences and engineering. Introduction to MATLAB as a tool for solving differential equations. Prerequisite: MATH 125. Offered: AWSpS.

AMATH 352 Applied Linear Algebra and Numerical Analysis (3) NW Development and application of numerical methods and algorithms to problems in the applied sciences and engineering. Applied linear algebra and introduction to numerical methods. Emphasis on use of conceptual methods in engineering, mathematics, and science. Extensive use of MATLAB package for programming and solution techniques. Prerequisite: either MATH 126 or Q SCI 293.

AMATH 353 Fourier Analysis and Partial Differential Equations (3) NW Heat equation, wave equation, and Laplace's equation. Separation of variables. Fourier series in context of solving heat equation. Fourier sine and cosine series; complete Fourier series. Fourier and Laplace transforms. Solution of partial differential equations on infinite domains. D'Alembert's solution for wave equation. Prerequisite: either AMATH 351 or MATH 307. Offered: AWSp.

AMATH 383 Introduction to Continuous Mathematical Modeling (3) NW Introductory survey of applied mathematics with emphasis on modeling of physical and biological problems in terms of differential equations. Formulation, solution, and interpretation of the results. Prerequisite: either AMATH 351 or MATH 307. Offered: AWSpS.

AMATH 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with MATH 400 and STAT 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSE at the 300 or 400 level, including MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

AMATH 401 Vector Calculus and Complex Variables (4) NW Emphasis on acquisition of solution techniques; ideas illustrated with specific example problems arising in science and engineering. Applications of vector differential calculus, complex variables. Line-surface integrals; integral theorems; Taylor and Laurent series, contour integration. Prerequisite: MATH 324. Offered: A.

AMATH 402 Methods for Ordinary Differential Equations (4) NW See 401. Applications of ordinary differential equations; review of elementary concepts for first and second order equations; power series and Frobenius solutions. Laplace transforms; systems of differential equations, eigenvalues. Prerequisite: either AMATH 351 or MATH 307. Offered: W.

AMATH 403 Methods for Partial Differential Equations (4) NW See 401. Applications of partial differential equations; linear and quasilinear first order equations, characteristics, shocks; classification of linear second order equations; basic solution techniques for parabolic, elliptic, and hyperbolic equations; Green's functions and integral transform methods. Prerequisite: AMATH 402.

AMATH 422 Introduction to Mathematical Biology (3) NW Mathematical modeling in biology and medicine. Introduction to chaos and nonlinear dynamics, population models (predator-prey and competition systems), epidemic models with applications to sexually transmitted diseases and dynamic diseases, enzyme kinetics, biological oscillators and switches. Prerequisite: either AMATH 351, MATH 136, or MATH 307. Offered: W.

AMATH 423 Mathematical Biology: Stochastic Models (3) NW Introduction to the basics of stochastic models. Applications are taken from the biomedical sciences such as random movement of cells and molecules, activation of neurons, cancer growth and spread, population dynamics, kinetics of unimolecular reactions. Prerequisite: either AMATH 351 or MATH 307, MATH/STAT 390. Offered: Sp.

AMATH 441 Introduction to Fluid Dynamics (3) NW Eulerian equations of mass and motion.

Surface forces. Vorticity and vortex dynamics. Water waves and interfacial waves; concept of phase and group velocities. Linear instability theory. Simple viscous flows; boundary layer theory, potential theory. Low Reynolds-number flows, application to biological fluid flows. Prerequisite: AMATH 353.

AMATH 490 Special Topics (1-5, max. 15)
Topics of current interest in applied mathematics not covered by other undergraduate courses.

AMATH 498 Senior Project or Thesis (1-6, max. 6) Intended for Honors students and other advanced undergraduates completing a special project or senior thesis in applied mathematics. Offered: A/WSpS.

AMATH 499 Undergraduate Reading and Research (1-6, max. 6) Credit/no credit only. Offered: A/WSpS.

AMATH 500 Special Studies in Applied Mathematics (*, max. 12) Lectures and discussions of topics of current interest in applied mathematics. May not be offered every quarter; content may vary from one offering to another. Prerequisite: permission of instructor.

AMATH 501 Seminar in Applied Mathematics (1, max. 6) Special topics and selected problems of current interest in applied mathematics. Credit/no credit only. Offered: A/WSp.

AMATH 502 Applied Mathematics Clinic (1)
The clinic provides consulting service for problems from different academic units requiring assistance in formulation, analysis, and interpretation of mathematical models. Students learn to delineate sources of difficulties, identify or devise a method of solution, and effectively communicate it to clients. Credit/no credit only. Prerequisite: AMATH 568, AMATH 569, and AMATH 584. Offered: A/WSp.

AMATH 503 Mathematical Biology I (3)
Mathematical modeling in biomedical sciences (mainly ecology, epidemiology, physiology, and zoology). Topics covered include modeling (continuous and discrete), population interactions, dynamic diseases, reaction kinetics, biological oscillators, oscillator generated wave phenomena, epidemics, and the dynamics of infectious diseases. Prerequisite: AMATH 402 or equivalent knowledge of ordinary differential equations. Offered: A.

AMATH 504 Mathematical Biology II (3)
Mathematical modeling in the biomedical sciences (mainly ecology, epidemiology, and zoology). Topics include spatial spread of populations, traveling wave phenomena in biology, reaction diffusion theory, biological pattern formation mechanisms, mechanochemical theory of morphogenesis, spatial spread of epidemics. (May be taken independently of 503.) Prerequisite: AMATH 402, AMATH 403 or equivalent; ordinary, partial differential equations. Offered: W.

AMATH 505 Introduction to Fluid Dynamics (4)
Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with ATM S 505/OCEAN 511; A.

AMATH 506 Applied Probability Statistics (4)
Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with STAT 506.

AMATH 507 Calculus of Variations (5)
Necessary and sufficient conditions for a weak and strong extremum. Legendre transformation, Hamiltonian systems. Constraints and Lagrange multipliers. Space-time problems with examples from elasticity, electromagnetics, and fluid mechanics. Sturm-Liouville problems. Approximate methods. Prerequisite: AMATH 351 or MATH 307; MATH 324, 327; recommended: AMATH 402 and AMATH 403 or MATH 428 and 429.

AMATH 509 Theory of Optimal Control (3)
Trajectories obtained from ordinary differential equations with control variables. Controllability, optimality, the maximum principle. Relaxation and the existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to AMATH 507 or AMATH 515. Offered: jointly with MATH 509; even years.

AMATH 510 Applications of Optimization in Engineering Design (3) *Zabinsky* Discussion of issues arising in applications of optimization to engineering design. Emphasis on formulating problems and selecting appropriate solution techniques. Random search methods for problems otherwise computationally intractable. Individual projects in engineering optimal design. Prerequisite: AMATH/MATH/IND E 515 and MATH 328 or permission of instructor. Offered: jointly with IND E 516.

AMATH 512 Methods of Engineering Analysis (3) Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Offered: jointly with CHEM E 512; A.

AMATH 514 Networks and Combinatorial Optimization (3) Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment problems. Algorithms and applications. Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with MATH 514.

AMATH 515 Fundamentals of Optimization (5)
Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/MATH 515.

AMATH 516 Numerical Optimization (3)
Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic

programming. Cutting planes and nonsmooth optimization. Prerequisite: AMATH 515. Offered: jointly with MATH 516.

AMATH 517 Optimization Under Uncertainty (3) Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications to optimal stopping, inventory control, resource management. Prerequisite: AMATH 506 (or an introduction to basic concepts of probability such as STAT 390 or 394, 395), MATH 308 and 324. Offered: jointly with MATH 517.

AMATH 520 Special Topics in Mathematical Applications (5, max. 15) In-depth study of an application topic in applied mathematics. Topics may include special studies in geophysical fluid dynamics, hydrodynamic stability, turbulence, analytic dynamics, solid mechanics, applied optimization, tensor analysis, stochastic analysis, and nonlinear optics and lasers. Offered: W.

AMATH 521 Special Topics in Mathematical Biology (5, max. 15) DNA-folding, pattern-forming systems, stochastic analysis. Prerequisite: AMATH 402 or equivalent. Offered: Sp.

AMATH 563 Methods of Partial Differential Equations II (3) Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

AMATH 564 Methods of Partial Differential Equations III (3) Nonlinear first-order partial differential equations: characteristics, applications to geometrical optics and Hamilton-Jacobi theory. Linear and quasilinear hyperbolic equations: conservation laws, characteristics, shocks, examples from fluid dynamics. Approximate solution methods: regular, singular, and multiple-scale perturbations. Prerequisite: AMATH 569. Offered: odd years.

AMATH 567 Complex Variables (5) Complex variable and associated topics. Branch cuts, series and product expansions. Contour integration, numerical implications. Harmonic functions. Complex potential (and singularities) in physical problems. Conformal mapping; applications and examples. Fourier and Laplace transforms and applications. Recommended: 401 or equivalent. Offered: A.

AMATH 568 Advanced Methods for Ordinary Differential Equations (5) Survey of practical solution techniques for ordinary differential equations. Linear systems of equations including nondiagonal case. Nonlinear systems; stability phase plane analysis. Asymptotic expansions. Regular and singular perturbations. Recommended: 402 or equivalent. Offered: W.

AMATH 569 Advanced Methods for Partial Differential Equations (5) Analytical solution techniques for linear partial differential equations. Discussion of how these arise in science and engineering. Transform and Green's function methods. Classification of second-order equations, characteristics. Conservation laws, shocks. Prerequisite: AMATH 403, AMATH 568 or MATH 428 or permission of instructor. Offered: Sp.

AMATH 570 Asymptotic and Perturbation Methods (5) Asymptotics for integrals, perturbation and multiple-scale analysis. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or permission of instructor. Offered: A.

AMATH 571 Spectral Methods (5) Analysis and application of spectral methods for the numerical solution of differential equations. Fourier methods and the FFT; collocation methods; polynomial interpolation and Chebyshev series; approximation theory and spectral accuracy; boundary conditions. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or permission of instructor. Offered: W.

AMATH 572 Introduction to Applied Stochastic Analysis (5) Introduction to the theory of probability and stochastic processes based on differential equations with applications to science and engineering. Poisson processes and continuous-time Markov processes, Brownian motions and diffusion. Prerequisite: AMATH/STAT 506, AMATH 402, or equivalent knowledge of probability and ordinary differential equations. Offered: Sp.

AMATH 573 Solitons and Nonlinear Waves (5) Methods for integrable and near-integrable nonlinear partial differential equations such as the Korteweg-de Vries equation and the Nonlinear Schrödinger equation; symmetry reductions and solitons; soliton interactions; infinite-dimensional Hamiltonian systems; Lax pairs and inverse scattering; Painlevé analysis. Prerequisite: AMATH 569, or permission of instructor. Offered: A.

AMATH 574 Conservation Laws and Finite Volume Methods (5) Theory of linear and nonlinear hyperbolic conservation laws modeling wave propagation in gases, fluids, and solids. Shock and rarefaction waves. Finite volume methods for numerical approximation of solutions; Godunov's method and high-resolution TVD methods. Stability, convergence, and entropy conditions. Prerequisite: AMATH 586 or permission of instructor. Offered: W.

AMATH 575 Dynamic Systems (5) Overview of ways in which complex dynamics arise in nonlinear dynamical systems. Topics include bifurcation theory, universality, Poincaré maps, routes to chaos, horseshoe maps, Hamiltonian chaos, fractal dimensions, Liapunov exponents, and the analysis of time series. Examples from biology, mechanics, and other fields. Prerequisite: AMATH 568 or equivalent.

AMATH 577 Perturbation Theory I (3) Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

AMATH 578 Perturbation Theory II (3) Regular perturbations. Singular perturbations: matched asymptotic expansions, boundary layers, shock layers, uniformly valid solutions. The methods of multiple scales and averaging, weakly nonlinear wave propagation problems and resonance phenomena, homogenization, nonlinear wave

propagation in fluid, solid, and particle mechanics. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent. Offered: even years.

AMATH 580 Mathematical Communication for Graduates (2) Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with MATH 500 and STAT 500.

AMATH 581 Scientific Computing (5) Project-oriented computational approach to solving problems arising in the physical/engineering sciences, finance/economics, medical, social and biological sciences. Problems requiring use of advanced MATLAB routines and toolboxes. Covers graphical techniques for data presentation and communication of scientific results. Prerequisite: Proficiency in basic MATLAB or AMATH 301, or permission of instructor.

AMATH 584 Applied Linear Algebra and Introductory Numerical Analysis (5) Numerical methods for solving linear systems of equations, linear least squares problems, matrix eigen value problems, nonlinear systems of equations, interpolation, quadrature, and initial value ordinary differential equations. Offered: jointly with MATH 584; A.

AMATH 585 Numerical Analysis of Boundary Value Problems (5) Numerical methods for steady-state differential equations. Two-point boundary value problems and elliptic equations. Iterative methods for sparse symmetric and non-symmetric linear systems: conjugate-gradients, preconditioners. Prerequisite: AMATH 584/MATH 584 which may be taken concurrently. Offered: jointly with MATH 585; W.

AMATH 586 Numerical Analysis of Time Dependent Problems (5) Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with ATM S 581/MATH 586; Sp.

AMATH 587 Asymptotics and Special Functions (3) Origin and properties of higher transcendental functions; theoretical basis and applications of Laplace, Fourier, Bessel, Mellin transforms; asymptotic analysis, including methods of steepest descent and stationary phase, WKB. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

AMATH 588 Green's Functions and Integral Equations (3) Review of Sturm-Liouville theory. Green's functions and integral representation of solution to PDEs. Fredholm and Volterra integral equations. Hilbert-Schmidt theory. Singular integral equations of Cauchy type. Applications to science and engineering. Prerequisite: AMATH 567, AMATH 568, AMATH 569, or equivalent.

AMATH 592 Special Topics in Stochastic Analysis and Modeling (5) Stochastic techniques and models with applications. Markov process and diffusion, stochastic differential equations, randomly perturbed dynamical systems, and statistical mechanics. Prerequisite: AMATH 572, or permission of instructor.

AMATH 594 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing,

such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 594.

AMATH 595 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 595.

AMATH 596 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. AMATH 584, 585, 586, or equivalent. Offered: jointly with MATH 596.

AMATH 600 Independent Research or Study (*) Credit/no credit only.

AMATH 700 Master's Thesis (*) Credit/no credit only.

AMATH 800 Doctoral Dissertation (*) Credit/no credit only.

Art

ART 121 Drawing (5) VLPA Drawing studied as the means of creating a coherent visual and expressive statement. Development of ability in the fundamentals of drawing: line, tone, and gesture, theory and practice of linear and aerial perspective, and basic concepts of composition. Offered: AWSp.

ART 124 Three-Dimensional Design Fundamentals (5) VLPA Through use of a variety of materials, three-dimensional fundamentals are investigated for formal and conceptual concerns as they apply to the visual arts. Offered: AWSp.

ART 126 Topics in Studio Art (5) VLPA Studio-based class introducing students, through particular studio practice of individual instructors, to methods of visual awareness, principles of organization, and approaches to visual and conceptual observation. Relationship between art history and contemporary art practice. Artistic medium in each class varies with instructor expertise. Offered: AWSpS.

ART 131 Alternative Approaches to Art and Design (5, max. 20) VLPA Presentation of process through which artists discover and translate ideas, feelings, and concerns into images or objects. Use of a wide variety of methods and approaches, from traditional to technological, to promote visual expression. Discussion and critiques leading toward better understanding the creative process.

ART 133 Color Theory and Practice (5) VLPA Examination of color as distinct visual phenomenon with investigations of its practical, theoretical, and illusionary aspects. Various media and materials employed in exercises and compositions that demonstrate properties of color structure, symbolism, and perception and their potential applications to art and design.

ART 140 Basic Photography (5) VLPA Introduction to theory, techniques, and processes of still photography. Projects stress the visual and creative potential of the medium. (Students

must provide a camera with lens, shutter, and aperture controls.) Offered: AWSpS.

ART 150 Three-Dimensional Design Fundamentals (5) VLPA Introduction to fundamentals of three-dimensional design process. Both practical and conceptual skills explored and demonstrated through assigned project or projects.

ART 166 Design Foundations (5) VLPA The rudiments of visual structure and organization in two-dimensional design. Covers formal principles of composition with an emphasis on design processes and serves as the groundwork for subsequent design courses. Required for application to the Visual Communication Design major. Offered: A.

ART 190 Introduction to Drawing (5) VLPA Builds basic drawing skills, develops understanding of primary concepts which relate to drawing and develops an understanding of the grammar or syntax of two-dimensional language. Students move beyond their current knowledge and abilities and link new skills, concepts, and understandings to creative expressing. Offered: AWSp.

ART 201 Ceramic Art: Handbuilding (5) VLPA Introduction to handbuilding; kiln firing and glazing processes. Examination of contemporary sculpture in clay.

ART 202 Ceramic Art: Wheel Throwing (5) VLPA Introduction to wheel throwing, glazing, and kiln firing processes. Examination of contemporary vessel form in clay.

ART 205 Introduction to Visual Communication Design (5) VLPA Continuation of the incoming student evaluation process for the visual communication design program. Presents a set of problems that further define the study and practice of visual communication design. Addresses organizational, conceptual, compositional, and typographic problems.

ART 206 Photographic Visualizations (5) VLPA Explores photography as a means of visualizing ideas in the context of visual communication design. Students complete a series of assignments that consider technical and formal issues, critical thinking, concept development, and experimentation. Offered: Sp.

ART 207 Drawing for Design Communication (5) VLPA Concentrates on developing skills used to communicate ideas that exist in the imagination. Focuses on study of design drawing history and development of basic skills necessary for ideation, exploration, communication, explanation. Prepares students to visualize and discuss ideas rapidly and professionally. For design majors only. Offered: A.

ART 208 Survey of Design History (5) VLPA Comprehensive survey of the ideas, events, and individuals that determined the design of information, objects, culture, and commerce across societies. Examines the social, political and cultural contexts that shape graphic design and the ideologies and relationships of similar movement in art and architecture. Late 19th Century - contemporary issues.

ART 209 Fundamentals of typography (5) VLPA Develops understanding of and sensibility to typographic details used to create effective communication. Focus moves from understanding letter forms that make up words to the

complexities of developing phrases, sentences, and short paragraphs with multiple levels of hierarchical meaning. Prerequisite: ART 207; ART 208. Offered: W.

ART 210 Collaboration and Improvisation (5) VLPA Introduces key factors in the theory and practice of creating and participating in collaborative projects. Focuses on creating and participating in effective teams, understanding strengths and roles within teams, working through team issues, developing techniques for interdisciplinary problem solving. Prerequisite: ART 207; ART 208.

ART 211 Image Methodology (5) VLPA Imagery as essential to visual communication. Ways that meaning and representation in images profoundly impact understanding. Focus on expanding image making, ideation skills, developing experimental visual processes to create meaning, finding engaging and imaginative solutions. Exploration of symbolism, abstraction, metaphors. Prerequisite: ART 209; ART 210. Offered: Sp.

ART 212 Human-Centered Design (5) VLPA Introduces design methodologies including ergonomics, participatory design, user research, ethnography, inclusive design, usability testing. Focuses on design methods leading to more humane technology, providing platforms for innovation, reframing problems in unique ways, explaining complex information, exploring alternatives, visualizing and communicating solutions. Prerequisite: ART 209; ART 210. Offered: .

ART 226 Introduction to Structure (5) VLPA Explores the structure of two- and three-dimensional textile forms. Students work with floor looms, computer-aided looms, as well as working directly with materials.

ART 227 Introduction to Surface (5) VLPA Basic techniques of dying, printing, and embellishing, with emphasis on their conceptual uses in art making.

ART 234 History of Public Art and Public Space (5) VLPA *Young* Survey of the melding of public art, architecture, and landscape architecture through the ages, starting with Stonehenge, the Pyramids, and Gothic cathedrals, and ending with contemporary earthworks, public art, and twenty-first century performance art. Offered: W.

ART 241 Intermediate Photography I (5) VLPA Studio projects examining the expressive and conceptual uses of alternative photographic materials and techniques. Prerequisite: ART 140. Offered: A.

ART 245 Concepts in Printmaking (5) VLPA Introduction to contemporary printing methods such as monotype, monoprint, stencil, and photocopy. Survey of historical and current approaches to the art of printmaking.

ART 246 Works on Paper/Monotype (5) VLPA Introduces contemporary imaging methods, expands traditional drawing methods, and encourages relationship of content to structure. Introduces relationship of printmaking and painting to drawing through monotype methods.

ART 258 Introduction to Metals (5) VLPA Introduction to concepts and techniques of metal design with an emphasis on jewelry. Skill

acquisition includes sawing, filing, soldering, forging, and casting. Offered: AWSpS.

ART 261 Introduction to Industrial Design (5) VLPA Fundamentals of three-dimensional design. Form studies in relation to geometry, structure, value, production, meaning, and context.

ART 262 Introduction to Industrial Design (5) VLPA Fundamentals of three-dimensional design. Form studies in relation to geometry, structure, value, production, meaning, and context. Prerequisite: ART 261.

ART 263 Introduction to Industrial Design (5) VLPA Fundamentals of three-dimensional design. Form studies in relation to geometry, structure, value, production, meaning, and context. Prerequisite: ART 262.

ART 272 Beginning Sculpture — Casting (5) VLPA *Taylor* Fundamentals of composition in the round and relief with an emphasis on non-metal casting.

ART 273 Beginning Sculpture — Wood and Metal (5) VLPA *Lynn* Introduction to sculpture, focusing on the use of wood and metal. Investigations center on a wide variety of methods and approaches, from traditional to technical, to promote visual expression. Class discussions and critiques focus on better understanding of the creative process.

ART 290 Beginning Drawing: The Figure (5) VLPA Introduction to the human figure as historically traditional subject matter as well as an important component in self expression. Covers proportion, foreshortening, and composition. Prerequisite: ART 190. Offered: AWSpS.

ART 291 Beginning Drawing Topics (5) VLPA Revolving topics in the study of drawing at the beginning level Prerequisite: ART 190. Not open for credit to students having taken ART 290.

ART 292 Beginning Painting (5) VLPA Beginning oil painting. Prerequisite: ART 290.

ART 293 Beginning Painting Topics (5) VLPA Revolving topics in the study of painting at the beginning level. Prerequisite: either ART 290 or ART 291.

ART 317 Design for Industry (5) VLPA Product design, working drawings, models, presentation drawings, product analysis, display, marketing. Prerequisite: ART 316.

ART 318 Design for Industry (5) VLPA Product design, working drawings, models, presentation drawings, product analysis, display, marketing. Prerequisite: ART 317.

ART 320 Industrial Design Special Projects (5, max. 15) VLPA Progressive industrial design methodology and criticism introduced through projects corresponding to major international design competitions, visiting critics and lecturers, corporate sponsored projects, or faculty design research. Independent or group work on projects to expand students' visual research, drawing, modelmaking, presentation, and literacy skills. Includes contemporary manufacturing and information technologies. Prerequisite: ART 261.

ART 321 Furniture Design (5) VLPA Design of a furniture piece. Methodologies and construction, types of hardware, special shop techniques, scale modeling and full-scale functional designs.

ART 322 Presentation for Industrial Design I (5) VLPA Introduction to presentation skills, from quick sketching of design concepts to refined representation of the finished design in a two-dimensional format. Emphasis on accuracy and development of an individual style. Prerequisite: ART 261.

ART 328 Intermediate Fiber Studio (5, max. 15) VLPA Explores more advanced techniques used in the basic fiber media, weaving and surface design. Technical focus of each class varies. Covers pattern development, expanded scale, visual clarity, and conceptual depth. Prerequisite: either ART 226 or ART 227.

ART 329 Topics in Fiber Art (5, max. 15) VLPA Explores a range of special topics in fibers, including non-traditional materials and processes and interdisciplinary areas of interest within the field, while offering specific technical, hands-on training when appropriate. Emphasizes the development of the thematic content of the individual's work.

ART 330 History of Textiles (5) VLPA Overview of Western textiles from Coptic tapestry through industrialization. Discussion of textiles not only in aesthetic terms but also as cultural documents arising from, and reflecting, a broad range of societal pressures and concerns. Special topics in contemporary issues and non-Western textiles with emphasis on holdings in the University collection.

ART 332 Intermediate Sculpture Composition — Public Art (5, max. 15) VLPA Intermediate work in various media and techniques with an emphasis on the creation of public art.

ART 333 New Materials and Processes (5, max. 15) VLPA Exploration of the process through which artists discover and translate ideas, feelings, and concerns into images or objects. Introduction of new ways of thinking, new materials and processes in the investigation of a variety of sculpture methods and approaches.

ART 334 Public/Professional Art Issues (5, max. 15) VLPA *Young* Topics vary, centering on issues of public art and professional practices.

ART 335 Metal Casting (5, max. 15) VLPA Introduction to foundry techniques as applied to fine arts casting of ferrous and nonferrous material. Prerequisite: ART 272.

ART 340 Digital Imaging I (5) VLPA Introduction to the creative use of 2-D image manipulation and transformation of photographic and non-photographic imagery on the computer. Variety of programs, procedures, hardware (Macintosh platform), input, and output considered and employed. Previous computer experience not required. Prerequisite: ART 241. Offered: W.

ART 341 Digital Imaging II (5) VLPA *Berger* Advanced topics in 2-D imaging, with emphasis on creative exploration of both software tools and possible integration with traditional art media. Prerequisite: ART 340.

ART 342 Contemporary Issues in Photography (5) VLPA An in-depth survey of contemporary artists and issues in photography. Prerequisite: ART 241; ART 340. Offered: S.

ART 343 Advanced Photography (5, max. 15) VLPA Topics in advanced photography, including: color printing, large-format photography, artificial

lighting, and photography image transformation. Prerequisite: ART 340. Offered: AWSp.

ART 345 Intermediate Printmaking (5, max. 25) VLPA Development of mature and personal statement within context of the print form through studio practice and group discussion and critique. Processes and media emphasis varies on a revolving basis.

ART 350 Printmaking Special Projects (5, max. 15) VLPA Approaches to water based printmaking. Introduces serigraphy, collagraph and relief printing through lecture, critique, class discussion, and creative practice. Prerequisite: two from the following: ART 124, ART 126, ART 140, ART 166, or ART 190.

ART 353 Intermediate Ceramic Art (5, max. 20) VLPA Advanced work in forming, decorating, and glazing. Prerequisite: ART 201; ART 202.

ART 354 History of Body Adornment (5) VLPA Covers jewelry and other body adornment from Neolithic times to the present, worldwide. Discusses social and cultural relevance of forms, uses, and materials. Emphasis on today's studio craftspeople who make jewelry as a form of aesthetic expression outside the fashion mainstream.

ART 357 Interdisciplinary Concepts in Metal (5, max. 25) VLPA *Hu* Variable topics, introducing concepts that cross traditional studio definitions and address interdisciplinary approaches to artistic investigation. Topics include textile/metal processes, printmaking/metal processes, color and metal, chemical, electrical, and mechanical processes in sculpture. Prerequisite: two of the following: ART 124, ART 126, ART 140, ART 166, or ART 190.

ART 358 Topics in Metal (5, max. 25) VLPA *Hu* Variable topics introducing issues and practices in metal smithing and jewelry, and their application to contemporary artmaking. Topics include casting and stone setting, ancient techniques, forming metal, production and business practices. Prerequisite: ART 258.

ART 367 Communications Programs (5) VLPA Investigation of strategies and graphic interpretations using typography, images, and diverse applications of design. Emphasis on development of conceptual themes, graphically implemented across an array of communications media. Prerequisite: ART 366, ART 376. Offered: W.

ART 368 Case Studies in Corporate Identity (5) VLPA Research and analysis of visual identity systems for complex institutional and corporate entities. Focuses on issues that concern how design programs function across diverse application and media and how they engage various audiences. Prerequisite: ART 367, ART 377. Offered: Sp.

ART 377 Semiotics (5) VLPA Investigation of semiotics in the context of visual communication design through the study of symbolic representation. Students complete a quarter-long project in symbol design that emphasizes research analysis, design process, translation, and abstraction. Prerequisite: ART 366, ART 376.

ART 378 Information Architecture and Web Design (5) VLPA Fundamental issues in web design, including site planning, information architecture, navigation, visual hierarchy, and interactivity. Emphasis on understanding the

unique functional limitations of designing for the web while building an awareness of contemporary design practice. Design a simple site and produce a working a prototype. Prerequisite: ART 377. Offered: Sp.

ART 381 Design and Society (5) VLPA History, theory, and practice of ways design functions in society and culture. Emphasis on developing broad understanding of design production while working collaboratively and individually on a quarter-long research project concerned with producing a comprehensive conceptual map of the design discipline. Prerequisite: ART 211; ART 212.

ART 383 Fundamentals of Interaction Design (5) VLPA Focus on human-to-product interaction and ways we perceive, understand, and experience the world regards to objects, environments, or on-screen controls/information. Prerequisite: ART 211; ART 212.

ART 390 Intermediate Drawing (5, max. 10) VLPA Prerequisite: ART 290.

ART 391 Intermediate Drawing Topics (5) VLPA Revolving topics in the study of drawing at the intermediate level. Prerequisite: either ART 290 or ART 291.

ART 392 Intermediate Painting (5, max. 10) VLPA Prerequisite: ART 292, ART 390. Offered: AWSp.

ART 393 Intermediate Painting Topics (5) VLPA Revolving topics in the study of painting at the intermediate level. Prerequisite: either ART 292 or ART 293: ART 390.

ART 428 Senior Thesis in Fiber Arts (5, max. 20) VLPA Specialized investigation involving surface design and/or fabric structures. Prerequisite: ART 328; ART 329.

ART 436 Sculpture Composition (5, max. 15) VLPA Individual compositions in various media in large scale. Prerequisite: either ART 332, ART 333 or ART 335.

ART 445 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 318.

ART 446 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 445.

ART 447 Advanced Industrial Design (5) VLPA Market analysis and selected professional problems in industrial design. Consultation techniques; psychological, sociological, and economic factors involved in designing for consumer acceptance. Prerequisite: ART 446.

ART 450 Individual Projects in Printmaking (5, max. 15) VLPA Individual media study within the context of group discussion and critique.

ART 457 Artist Handmade Books (5) VLPA The creative and structural development of an artist's book. Focuses on issues of sequential imagery, conceptual development, and the relationship between work and image.

ART 458 Alternative Approaches to Drawing (5) VLPA Advanced works-on-paper class. Focuses on drawing issues such as formal process, working methods, conceptual development, and practical working applications.

ART 460 Advanced Metal Design (5, max. 25) VLPA Advanced individual projects in metal design. Prerequisite: either ART 357 or ART 358.

ART 466 Publication Design (5) VLPA Stresses the research, development, organization, design, and presentation of a complex printed document, such as a journal, annual report, or large publication. Addresses all aspects of design, content, image creation, and production through a quarter-long project. Prerequisite: ART 368; ART 378. Offered: A.

ART 467 Environmental Design (5) VLPA Working with 3-dimensional space, students explore the integration and presentation of graphic images and typographic messages sequenced in a given space. Explores the possibilities and multi-disciplinary character of exhibition planning and design. Prerequisite: ART 466, ART 478. Offered: W.

ART 478 Information Design (5) VLPA Exploration of strategies for enhancing and visually presenting complex statistics and data. Various information subjects are selected and formed into charts, diagrams, graphs, tables, directories and maps. Identify, through personal investigations, the principles which provide the most successful means for presentation of information. Prerequisite: ART 368; ART 378.

ART 479 Interaction Design (5) VLPA Exploration of design issues unique to user-centered interaction in digital media. Explore a range of formal and conceptual issues including user interface, organization, narrative, motion, time, and sound. Prerequisite: ART 466, ART 478. Offered: W.

ART 480 Senior Project/Presentation (5) VLPA Presents an opportunity for advanced, individualized design research and study. Complete a unique capstone project based on individual design interests and prior experiences in the VCD program. Public exhibition of this project is required in the BFA Graduation Exhibition. Prerequisite: ART 467, ART 479. Offered: W.

ART 481 Issues in Design Theory (5) VLPA Students develop an understanding of significant theoretical models related to design through a series of readings, lectures, discussions, and assignments. Prerequisite: ART 211; ART 212.

ART 482 Capstone Design Project (5, max. 10) VLPA Two-quarter sequence capstone for students in the design studies program. Develop individual projects that address issues of theory and practice in the design field. Students present their projects in a public forum. Prerequisite: ART 381; ART 481.

ART 483 Fundamentals of Interface Design (5) VLPA Highlights the role visual interface designers play in the multi-disciplinary attempt to achieve functionality and usability. Introduces the unique challenges of designing within the realm of a digital and interactive medium to create products that humans find usable, useful, and desirable. Prerequisite: ART 383.

ART 484 Projects in Interaction Design (5) VLPA Project-based course gives students the

opportunity to explore key issues and theories in the field of interaction design. Multi-disciplinary studio requiring collaboration between students from a variety of backgrounds including design, engineering, and computer science. Prerequisite: ART 383; ART 483.

ART 485 Advanced Ceramic Art (5, max. 20) VLPA Pottery design and construction, stoneware, clay bodies, glazes. Prerequisite: ART 353.

ART 488 Senior Source Presentation, Ceramics (5) VLPA Designed to allow ceramics majors to explore and define the primary sources of inspiration for their interest in art and why they make it.

ART 491 Advanced Drawing Topics (5) VLPA Revolving topics in the study of drawing at the advanced level. Prerequisite: either ART 390 or ART 391. Not open for credit to students having taken ART 490.

ART 492 Advanced Painting: The Figure (5, max. 10) VLPA Drawing and painting from the model. Prerequisite: ART 390; ART 392. Offered: AWSp.

ART 493 Advanced Painting Topics (5) VLPA Revolving topics in the study of painting at the advanced level. Prerequisite: either ART 390 or ART 391; either ART 392 or ART 393.

ART 494 Senior Seminar in Painting and Drawing (5, max. 15) VLPA Development of individuality in painting through creative exercises. Prerequisite: ART 492. Offered: AWSp.

ART 496 Undergraduate Internship (2-5, max. 10) Faculty supervised fieldwork in art related activities. Credit/no credit only.

ART 497 Study Abroad-Studio Individual Projects (3-10, max. 20) VLPA .

ART 498 Individual Projects-Painting/ Sculpture (2-5, max. 15) .

ART 499 Individual Projects-Design (2-5, max. 15) .

ART 512 Graduate Seminar (3, max. 9) .

ART 513 Contemporary Studio Theories and Problems (3) .

ART 515 Photography (3-15, max. 60) .

ART 522 Sculpture (3-15, max. 60) .

ART 540 Fiber Arts (3-15, max. 60) .

ART 547 Industrial Design (3-15, max. 60) .

ART 550 Printmaking (3-15, max. 60) .

ART 553 Ceramic Art (3-15, max. 60) .

ART 558 Metal Design (3-15, max. 60) .

ART 581 Graduate Seminar in Design (5, max. 30) Critical issues in design. Topics vary. Offered: AWSp.

ART 582 Visual Communication Design Studio I (5) Topics vary.

ART 590 Interdisciplinary Graduate Seminar in Contemporary Practices (5, max. 25)

Constructive forum for developing dialogue and critique in practicum-based setting. Professional development highlights the student's experience.

ART 591 Graduate Studio: Drawing (3, max. 15) Supervised studio for advanced-level students from various media-based disciplines designed to develop an interest in and familiarity with aspects of drawing. Utilization of various media. Discussion of historical and contemporary issues concerning drawing.

ART 592 Graduate Studio: Painting (3-15, max. 60) Offered: AWSp.

ART 594 Graduate Seminar in Painting and Drawing (3, max. 18) Designed as a forum for the presentation and criticism of student work as well as for discussion of contemporary directions in visual art. Credit/no credit only.

ART 595 Master of Fine Arts Research Project (2-5, max. 9) An independent research project related to and informed by the MFA student's studio work. Final project form may be a lecture, slide presentation, or paper.

ART 600 Independent Study or Research (*) .

ART 700 Master's Thesis (*) .

Art History

ART H 201 Survey of Western Art—Ancient (5) VLPA Major achievements in painting, sculpture, architecture, and the decorative arts in Europe, the Near East, and North Africa, from prehistoric times to the beginnings of Christianity.

ART H 202 Survey of Western Art—Medieval and Renaissance (5) VLPA The arts of the Byzantine Empire, Islam, and Western Christendom through 1520 AD.

ART H 203 Survey of Western Art—Modern (5) VLPA Western art from 1520 to the present.

ART H 204 Survey of Asian Art (5) I&S/VLPA Origins and interplay of major movements of South and East Asian art.

ART H 205 Survey of Tribal Art (5) I&S/VLPA Arts of Sub-Saharan Africa and Oceania from prehistoric times to the present and to the pre-Columbian arts of the Americas.

ART H 206 Survey of Native-North American Art (5) I&S/VLPA Survey of the indigenous arts of North America north of Mexico from ancient through contemporary times. Focuses on the historical and cultural contexts of the arts and the stylistic differences between tribal and individual artists' styles.

ART H 230 The African-American Tradition: A Transatlantic View of Art and Culture (5) I&S/VLPA Assesses the diversity of art by individuals of African descent in Brazil, the Caribbean, and the United States. Examines questions of form meaning, and symbolic and ritual behavior. Considers formal and conceptual relationships between art forms and their African sources; assesses their role in the construction of new African-American identities.

ART H 290 History of Architecture (5) I&S/VLPA Introduction to the history of architecture across a broad range of cultural contexts.

ART H 250 Rome (5) I&S/VLPA Focuses on Rome as an historical, intellectual, and artistic

world center. Literary and historic documents, visual arts, architecture, film, and opera used to explore the changing paradigms of the Eternal City. In English. Offered: jointly with ITAL 250 and HSTEU 250.

ART H 300 Ideas in Art (5) VLPA Selected monuments of art and architecture in the Western tradition, from the Greeks to the twentieth century, studied in relation to the intellectual background of the ages and civilizations that produced them. Slide lectures accompanied by discussion of assigned readings in philosophical, religious, scientific, political, literary, and artistic texts. Offered: jointly with CHID 300.

ART H 306 Indian Art of South Asia (5) VLPA Development of Indian art from its origins to the medieval period. Spread of Indian religions and related art forms in Tibet and Southeast Asia are briefly introduced.

ART H 309 Topics in ART History (5, max. 15) VLPA Topics vary.

ART H 311 Chinese Painting (5) I&S/VLPA An introduction to the role of painting in Chinese cultural history, with attention to regional geography, social structure, gender, traditional philosophies, twentieth-century socialism, and the patterns of Chinese history.

ART H 312 Chinese Art and Visual Culture (5) I&S/VLPA Introduction to Chinese art and visual culture from the ancient period to the present day. Examines the visual traits of important monuments of architecture, calligraphy, film, furniture, ceramics, bronze, painting, and sculpture. Emphasizes how different artistic styles are tied to different historical, social, and cultural contexts.

ART H 313 East Asian Art: Arts in China, Japan, and Korea (5) I&S/VLPA East Asian art and visual culture introduced through examples of art in China, Japan, and Korea from ancient times to present day. Emphasizes how artistic styles were tied to different social and cultural contexts, and how arts were transformed and exchanged within the larger cultural geographical circle of East Asia.

ART H 315 Buddhist Art and Material Culture of East Asia (5, max. 15) VLPA Buddhist painting and sculpture of China, Korea, and Japan. Explores religious meaning, artistic development, and historical significance. Examples from the sixth to the seventeenth centuries, along with paintings and contemporary carvings.

ART H 317 Chado-Japanese Esthetics (4) VLPA History, theory, and practice of chado, or *Way of Tea*, a Zen-inspired art that has had notable effects on Japanese society. Lectures on esthetics and cultural history supplemented by participation in chado, with the goal of developing sufficient understanding and skill to continue chado as a discipline.

ART H 318 Japanese Prints 1600-Present (5) VLPA *Bogel* Introduction to Japanese printmaking practices, style, and themes. Examines concerns related to gender, issues of representation, explicit sexual imagery, cultural and artistic practice, and the function of prints.

ART H 321 Arts of Japan (5, max. 15) I&S/VLPA The spectrum of Japanese art from prehistory to modern times. Examines the interrelationship of the major media for each

historical period. Central theme: the appreciation of the varied aesthetics active in the development of Japanese painting, architecture, sculpture, and ceramics.

ART H 330 Tribal Art and Philosophy (5) I&S/VLPA Philosophical inquiry and thought in African, Ameri-Indian, and Pacific island societies as expressed through the visual, musical, choreographic, and oral arts. Natural, moral, and ethical ideas as expressed in the arts.

ART H 331 Native Art of the Pacific Northwest Coast (5) I&S/VLPA Survey of the indigenous arts of the Pacific Northwest Coast from the Columbia River in the south to Southeast Alaska in the north. Overview of ancient through contemporary times, focusing on the historical and cultural contexts of the arts and the stylistic differences between tribal and individual artists' styles. Offered: jointly with ANTH 331.

ART H 337 African Art and Society (5) I&S/VLPA Explores the ideas and notions expressed visually in sculpture, painting, ceramics, textiles, and architecture and describes their relationships to man and culture in Africa.

ART H 340 Pre-Classical Art and Archaeology (3) VLPA Art and the other material remains of the civilizations in the Aegean from the Neolithic period to the end of the Bronze Age, with special emphasis on Minoan Crete and the Mycenaean kingdoms of mainland Greece; illustrated by slides. The history, techniques, and results of significant excavations. Offered: jointly with CL AR 340.

ART H 341 Greek Art and Archaeology (3) VLPA Material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the Geometric to the Hellenistic periods; illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered: jointly with CL AR 341.

ART H 342 Roman Art and Archaeology (3) VLPA Roman architecture and art, with emphasis on the innovations of the Romans; illustrated by slides. Offered: jointly with CL AR 342.

ART H 343 Hellenistic Art and Archaeology (3) VLPA Art of Greece and the eastern Mediterranean from the time of Alexander the Great to the Roman conquest. Principal sites with their sculpture, painting, mosaics, and minor arts examined in lectures with slides. Offered: jointly with CL AR 343.

ART H 350 The City of Cairo (3) I&S/VLPA Development of Fustat and Cairo, 600-1800, with special emphasis on art and architecture. Economic, social, and geographic influences on the creation of the distinctive Egyptian styles of Islamic art. Offered: jointly with NEAR E 350.

ART H 351 Early Medieval and Byzantine Art (5) I&S/VLPA Christian art and architecture of the Roman and Byzantine empires and of western Europe through the eighth century.

ART H 352 High and Late Medieval Art (5) I&S/VLPA Art and architecture of western Christendom from the time of Charlemagne to the Renaissance.

ART H 361 Italian Renaissance Art (5) VLPA Sculpture, painting, and architecture from 1300 to 1600.

ART H 366 Northern Renaissance Art (5) VLPA An overview of Netherlandish, French, and German art in the context of cultural developments circa 1400-1570.

ART H 372 Rococo to Romanticism (5) VLPA Mainstream of European art and architecture from about 1710 to about 1830. Attention is also given to central and eastern Europe, Scandinavia, and the colonial Americas.

ART H 373 Southern Baroque Art (3) VLPA Art of Italy and Spain, circa 1590 to circa 1710.

ART H 374 Northern Baroque Art (3) VLPA Art of France, England, and the Low Countries, circa 1590 to circa 1710.

ART H 380 Nineteenth- and Twentieth-Century Art (5) VLPA Arts and architecture of Europe and America from Romanticism to the present.

ART H 381 Art Since World War II (5) I&S/VLPA Art of Europe and the United States in the decades since World War II: painting, sculpture, and architecture, multiplication of new forms (video, performance pieces, land and installation pieces), changing context of patronage, publicity, and marketing.

ART H 382 Theory and Practice of Art Criticism (3) VLPA Major issues in art and architectural criticism: nature of art criticism, aims of the critic, differences between art and architectural criticism. Works by major critics and artists, mostly twentieth century.

ART H 384 American Art (5) I&S/VLPA Achievements and issues in painting, architecture, sculpture, and other arts in the United States from the colonial era to the present.

ART H 397 Art in Rome: Augustus to Mussolini (10) VLPA Survey of art in Rome; studies from original monuments. Offered in Italy as part of the Art History Seminar in Rome. Focuses on representative works from the most important periods of Italian art: Ancient, Medieval, Renaissance, Baroque, Modern. Site visits, field trips, individual research projects.

ART H 399 Study Abroad: Art History Individual Projects (3-10, max. 20) VLPA For participants in Study Abroad programs.

ART H 400 ART History and Criticism (2-5, max. 15) VLPA Courses on special topics, frequently by visiting faculty, which cannot be offered on a continuing basis. Consult art history office for subjects offered.

ART H 411 Chinese Painting Experiences, 900-1800 (3) VLPA Examines issues of style, theme, and function in Chinese painting from the tenth to the nineteenth century. Discusses painting practice, patronage, regional diversity, the relationship of word and image, amateurism vs. professionalism, and the introduction of foreign elements.

ART H 413 Selected Topics in Chinese Art (3, max. 9) VLPA Specific theme or area of Chinese art, such as the art of bronze age China or Chinese painting under Communist rule. Recommended: some background in Chinese art, history, language, or literature.

ART H 414 Song China: Painting Production and Cultural Encounters (5) VLPA Examines diverse regional development of painting production and cultural exchange by Song China

(960-1279) and its neighbors, Japan, Korea, Khitan/Liao, Jurchen/Jin, Tangut/Xi Xia. Focuses on well-known masterpieces, newly excavated material from tombs and archaeological sites, and little-studied anonymous works preserved in Japan.

ART H 419 Japanese Architecture (3) VLPA Survey of Japanese architecture from its origins to modern times. Although Shinto architecture, tea houses, gardens, and modern developments are discussed, the primary focus is on the development of Japanese Buddhist architecture. Recommended: some background in Japanese art, history, language, or literature. Offered: jointly with ARCH 453.

ART H 420 Art of the Japanese Print (3) VLPA Foundations of Ukiyo-e in Japanese genre from the twelfth through mid-seventeenth centuries; woodblock technique from the Heian period through the early Edo period. Emphasis on the changing styles and subject matter in Ukiyo-e Hanga from Moronobu through Kuniyoshi. Recommended: some background in Japanese art, history, language, or literature.

ART H 430 Chinese Cinema (5) I&S/VLPA Chinese film, 1930s to the present, studied as a visual art form, set in relation to traditional and modern Chinese arts and literature, modern history, gender, and other social issues. Recommended: some background in Chinese art, history, language, or literature.

ART H 432 Oceanic Art (3) I&S/VLPA Arts of Oceania, studied through cultures of Polynesia, Micronesia, Melanesia, and Australia.

ART H 433 Northern Northwest Coast Native-American Art: Methodologies in Stylistic Analysis (3) VLPA Stylistic and historical analysis of northern Northwest Coast art (Haida, Tlingit, Tsimshian, Northern Wakashan). Intensive analysis of formline rules; stylistic variation through time and between tribal and individual artists' styles. Recommended: some background in Native American art, history, languages, or literature.

ART H 434 Native-American Art and Ceremony of the Southern and Central Northwest Coast (3) I&S/VLPA Examination of the role of the visual arts in the ceremonial life of the Native-American people of the central and southern Northwest Coast. Emphasis on the traditional social and religious aspects of ceremonialism, contrasts between tribal traditions, and continuing twentieth-century traditions. Recommended: some background in Native American art, history, languages, or literature.

ART H 435 Thematic Studies in Native-American Art (3, max. 9) I&S/VLPA *Wright* Approach to Native-American art through themes and issues. Focus varies from year to year (e.g. Shamanism in Native-American art, gender identity in Native-American art, social and political aspects of Native-American art, issues in contemporary Native-American art). Recommended: some background in Native American art, history, languages, or literature.

ART H 436 Arts of Sub-Saharan Africa I (3) I&S/VLPA Traditional arts of the Western Sudan and the Western Guinea coast with their archaeological antecedents. Recommended: some background in African art, history, languages, or literature.

ART H 437 Arts of Sub-Saharan Africa II (3) I&S/VLPA Traditional arts of the Central Guinea coast, Nigeria, Cameroon, and Gabon, from precontact times to the present. Recommended: some background in African art, history, languages, or literature.

ART H 438 Arts of Sub-Saharan Africa III (3) I&S/VLPA Arts of Zaire, Angola, the Swahili coast, and southern Africa. Recommended: some background in African art, history, languages, or literature.

ART H 442 Greek Painting (3) VLPA Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with CL AR 442.

ART H 443 Roman Painting (3) VLPA Study of surviving painting from the Roman World, with emphasis on wall paintings from Pompeii and Herculaneum. Principal topics for discussion: the four styles of Pompeian painting the dependence of Roman painters on Greek prototypes, and the significance of various kinds of painting as domestic decoration. Offered: jointly with CL AR 443.

ART H 444 Greek and Roman Sculpture (3) VLPA History and development of Greek sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century BC. Offered: jointly with CL AR 444.

ART H 446 Greek Architecture (3) VLPA Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with CL AR 446/ARCH 454.

ART H 447 The Archaeology of Early Italy (3) VLPA *Harmon* Study of the principal archaeological sites of early Italy, including Etruria, Sicily, southern Italy, and archaic Rome up to the Republican period. Attention given to the material remains and their relationship to the Etruscan, ancient Sicilian, and early Roman civilizations. Offered: jointly with CL AR 447.

ART H 448 The Archaeology of Italy (3) VLPA *Harmon* Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with CL AR 448.

ART H 451 Topics in Early Christian and Byzantine Art and Architecture (3, max. 9) VLPA Specific theme or area of early Christian and Byzantine art and architecture, such as early Christian and Byzantine mosaics or the art of Constantinople.

ART H 452 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with RELIG 442.

ART H 453 Art, Religion, and Politics in Byzantium, 700-1453 AD (3) I&S/VLPA

Kartsonis Evolution of the art of Byzantium (700-1453 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with RELIG 443.

ART H 455 Special Studies in Gothic Art and Architecture (3) VLPA Detailed study of Gothic architecture and its accompanying sculpture and stained glass, with special emphasis on the twelfth and thirteenth centuries in France and England. Offered: jointly with ARCH 455.

ART H 457 Flemish Art 1585-1700 (3) VLPA *Goettler* History of art in the southern Netherlands during the so-called Counter-Reformation period. Discusses works by Antwerp's major painters (Rubens, van Dyck, Jordaens); new specializations in the various genres (portraiture, genre, landscape, and still-life painting); and developments of northern Baroque sculpture, architecture, and the decorative arts.

ART H 458 The Imagery of Heaven, Hell, and Purgatory (1300-1800) (3) VLPA *Goettler* Interdisciplinary approach to the aspects of devotional and visionary art that links art history with religious studies, literary history, and gender studies. Focuses on the media and pictorial genres created for different social groups of worshippers and viewers, from humble devotional objects to sophisticated artifacts of aesthetic and intellectual delight.

ART H 460 Topics in Northern European Art (3-5, max. 9) VLPA *Goettler* Approaches to the art of northern Europe through particular themes, genres, contexts, or other issues. Focus varies from year to year.

ART H 461 Early Renaissance Painting in Italy (3) VLPA Painting of the fourteenth and fifteenth centuries in central and northern Italy. Recommended: some background in Italian Renaissance art or history.

ART H 462 High Renaissance Painting in Italy (3) VLPA Painting in central and northern Italy, from about 1480 to about 1530: Leonardo, Raphael, the early Michelangelo, Sarto, Correggio, Bellini, Giorgione, and the early Titian. Recommended: some background in Italian Renaissance art or history.

ART H 463 Italian Renaissance Sculpture (3) VLPA From Nicola Pisano to Giambologna. Recommended: some background in Italian Renaissance art or history.

ART H 466 High Renaissance Painting in Venice (3) VLPA Painting in Venice, circa 1480 to circa 1580: Bellini, Carpaccio, Giorgione, Titian, Lotto, del Piombo, Tintoretto, and Veronese. Recommended: some background in Italian Renaissance art or history.

ART H 470 English Art: 1500-1800 (3) VLPA English art, principally painting, and, to a lesser extent, architecture. Emphasis on patronage, on the conditions that produced the decided peculiarities of English art, and on the final triumph of the native tradition. Recommended: some background in English history.

ART H 476 French Art: Eighteenth Century (3) VLPA Painting, sculpture, and prints; emphasis on the successive phases of Rococo style and iconography and the emergence of Neoclassicism.

ART H 481 Romanticism (3) VLPA Romantic tendencies of the late eighteenth and early

nineteenth centuries, with emphasis on stylistic and iconographic study of painting in Spain, England, Germany, France, and the United States to about 1830. Recommended: some background in the art or history of the period.

ART H 482 Realism and Impressionism (3) VLPA Art and the world, 1830-80: high Romanticism through Realism and Impressionism, with emphasis on painting in France. Recommended: some background in the art or history of the period.

ART H 483 Post-Impressionism to 1918 (3) VLPA Post-Impressionism and the great revolution of early twentieth-century art, with emphasis on painting. From the first revisions of Impressionism around 1880 to Fauvism, Cubism, Futurism, the Blaue Reiter, and Dadaism. Recommended: some background in the art or history of the period.

ART H 484 Topics in Modern Art (3, max. 9) VLPA Approach to art of the nineteenth and twentieth centuries through particular themes, genres, contexts, or other issues. Focus varies from year to year. Recommended: some background in the art or history of the period.

ART H 485 Italian Futurism, Dada, Surrealism (5) VLPA *Failling* Survey of three European early modern art movements whose ultimate objective was the collapse of bourgeois culture. Central issues: the role of art and artists in catalyzing social change, strategies for destroying public faith in logic, integration of verbal and visual signs and nonaesthetic conceptions of art. Recommended: some background in the art or history of the period.

ART H 486 Abstract Expressionism: History and Myth (5) VLPA Thematic and chronological survey of abstract expressionism, including major genres of critical interpretation, revisionist scholarship, and the relationship of artistic production to a larger context of visual production. Recommended: some background in the art or history of the period.

ART H 488 American Architecture (3) VLPA American architecture from indigenous native American traditions to the present. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 488.

ART H 490 Nineteenth-Century Architecture (3) VLPA From late eighteenth-century French rationalists, Neoclassicists, to *fin de siècle* Vienna and Paris. Includes theorists such as Ruskin, Viollet-le-Duc, and Semper; major movements, such as the Arts and Crafts, and the French Ecole des Beaux-Arts method of design. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 456.

ART H 491 Twentieth-Century Architecture (3) VLPA Architecture in the twentieth century, mainly in Europe and the United States. Traces roots of Modernism in Europe in the 1920s, its demise (largely in the United States) in the 1960s and recent trends such as Post-Modernism and Deconstructivism. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 457.

ART H 492 Alternative Art Forms Since 1960 (5) VLPA Survey of "post-studio" art forms developed in the 1960s by artists who did not equate artmaking with painting, sculpture, or

other traditional forms. Topics include: happenings, Fluxus, land projects, artists' video, artists, books, performance, site works, and art made for distribution on CD-ROM and on the World Wide Web.

ART H 493 Architecture Since 1945 (3) VLPA Theories and forms in architecture from the end of World War II to present. Includes new wave Japanese architects, recent Native-American developments, and non-Western as well as Western trends. Recommended: some background in the art, architecture, or history of the period. Offered: jointly with ARCH 459.

ART H 494 Paris: Architecture and Urbanism (3/5) I&S/VLPA Spans the architectural history of Paris, from its Gallic, pre-roman origins in the 2nd century BCE through the work of 21st century architects. Focuses on changing patterns of the physical fabric of the city and its buildings, as seen within the context of the broader political, social, economic, and cultural history. Offered: jointly with EURO 496.

ART H 495 Italian Fascism: Architecture and Power (5) I&S/VLPA *Clausen, Sbragia* Fascism in Italy as studied within the broader European context of nationalism, imperialism, and modernization, with particular emphasis on the arts — literature, film, architecture, and urbanism. Offered: jointly with ITAL 475; A.

ART H 497 Special Topics in Art in Rome (5, max. 10) VLPA Topics in art and architecture in Rome and environs, studied from original works. Offered in Italy as part of the art history Seminar in Rome. Topics vary. Site visits, field trips, and individual research projects.

ART H 498 Individual Projects, Undergraduate Practicum (2-5, max. 10) Fieldwork or internships in art-related areas in the community. Practical experience in areas such as arts administration, gallery and museum operations, collection cataloguing, curatorial responsibilities, and art education. Credit/no credit only.

ART H 499 Individual Projects (2-5, max. 10) .

ART H 500 Methods of ART History (5) Introduction to the specialized bibliography of art historical research and to the wide variety of approaches to art historical problems of all periods and regions.

ART H 501 Seminar in the General Field of Art (5, max. 15) .

ART H 504 Methods of Art History: Faculty Research (2) Discussion and analysis of methodological issues posed in faculty research. Credit/no credit only. Offered: W.

ART H 509 Seminar in Special Topics in ART History (5, max. 15) Specific focus changes from quarter to quarter.

ART H 511 Seminar in Chinese Art (5, max. 15) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of China.

ART H 515 Seminar in Japanese Art (5, max. 15) Critical appraisal of the principal research methods, theories, and types of literature dealing with the art of Japan.

ART H 531 Seminar in Tribal Art (5, max. 15) Methodological and cross-disciplinary problems in the visual arts of precolonial Africa, Oceania,

and America. Specific content varies.

ART H 533 Seminar in North American Indian Art (5, max. 15) Problems in North American Indian visual arts. Content varies.

ART H 541 Seminar in Greek and Roman Art (5) In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with CL AR 541.

ART H 551 Seminar in Early Christian, Byzantine, and/or Medieval Art and Architecture (5, max. 15) Problems in early Christian, Byzantine, and medieval art and architecture. Content varies. Prerequisite: permission of instructor.

ART H 561 Seminar in Italian Renaissance Art (5, max. 15) Problems and in-depth study of selected topics of the art of the Italian Renaissance.

ART H 566 Seminar in North European Art (5, max. 15) Deals with problems of style and iconography of the northern European masters of the fourteenth through seventeenth centuries.

ART H 577 Seminar in Baroque Art (5, max. 15) Iconographic and stylistic problems of the art of the Baroque period, with emphasis on the principal research methods, theories, and types of literature dealing with the art of the seventeenth and eighteenth centuries in Europe.

ART H 581 Seminar in Modern Art (5, max. 15) Art historical problems of the nineteenth and twentieth centuries.

ART H 590 Seminar in Criticism of Contemporary Art (5, max. 15) Contemporary art and appropriate critical methodology.

ART H 591 Seminar in Twentieth-Century Architecture (3/5) Specific focus changes from quarter to quarter. Prerequisite: graduate standing with background in art history, architecture, architectural history, or permission of instructor. Offered: jointly with ARCH 558.

ART H 592 Seminar in American Architecture (5) Clausen Topics vary. Offered: jointly with ARCH 529.

ART H 597 Graduate Internship (2-5, max. 5) Internship in the field of art history with a museum, gallery, or other faculty-approved art or architectural institution that can offer the student substantial research or curatorial experience. Credit/no credit only.

ART H 598 Master's Practicum (*, max. 15) Credit/no credit only.

ART H 599 Reading and Writing Projects (2) Art historical issues, methods, and materials. Required of all graduate majors registered in 400-level art history courses. Open also to graduate nonmajors.

ART H 600 Independent Study or Research (*) .

ART H 700 Master's Thesis (*) Credit/no credit only.

ART H 800 Doctoral Dissertation (*) Credit/no credit only.

Asian Languages and Literature

Asian Languages and Literature

ASIAN 201 Literature and Culture of China: Ancient and Classical (5) I&S/VLPA Introduction to ancient and classical Chinese literature in its cultural context. Texts in English translation. Offered: alternate years; A.

ASIAN 202 Literature and Culture of Japan: Traditional Japan (5) I&S/VLPA Introduction to traditional Japanese literature in its cultural context. Texts in English translation. Offered: alternate years; W.

ASIAN 203 Literature and Culture of Ancient and Classical India (5) I&S/VLPA Introduction to ancient and classical Indian literature in its cultural context. Texts in English translation. Offered: alternate years; Sp.

ASIAN 204 Literature and Culture of China from Tradition to Modernity (5) I&S/VLPA Introduction to modern Chinese literature in its cultural context. Texts in English translation. Offered: alternate years; A.

ASIAN 205 Literature and Culture of Japan from Tradition to Modernity (5) I&S/VLPA Introduction to Japanese literature of the nineteenth and twentieth centuries in its cultural context. May also include some Korean literature. Texts in English translation.

ASIAN 206 Literature and Culture of South Asia from Tradition to Modernity (5) I&S/VLPA *Pauwels, Shapiro* Introduction to medieval and modern South Asian literature in its cultural context. Texts in English translation. Offered: alternate years; Sp.

ASIAN 207 Special Topics in Literature and Culture of Asia (5) I&S/VLPA Introduction to the literature of one or more Asian traditions considered in its cultural context. Content varies depending on the specialization and interest of instructor. Texts in English translation. Offered: AWSp.

ASIAN 208 Introduction to the Civilization and Culture of Tibet (5) VLPA, I&S Comprehensive introduction to the society, history, and religion of Tibet. Discusses the most salient features of Tibetan civilization and examines their position in the larger context of Asian cultures. Traces the evolution of religio-historical developments from seventh century to 16th century. Other subjects include art, architecture, literature, and political structures. Offered: A.

ASIAN 211 Languages and Cultures of China (5) I&S/VLPA Provides a general survey of the languages and language-families in China, emphasizing the rich linguistic diversity found there today. Languages compared with English, from linguistic and cultural perspectives, to demonstrate not only characteristics but also mutual dependence throughout their development.

ASIAN 263 Great Works of Asian Literature (5) VLPA Selected major works of Asian literature. Taught on a rotational basis with the literary traditions of China, Japan, India covered in successive years. Content varies depending on specialization and interest of instructor. Primary emphasis on literary values of works and their

tradition; attention also given to historical and social contexts and the thought and value systems of the culture involved.

ASIAN 401 Introduction to Asian Linguistics (5) VLPA *Handel, K. Ohta, Shapiro* Linguistic analysis, with emphasis on languages of east, southeast, south, and central Asia. Includes phonetics, phonemics, morphology, syntax, historical reconstruction, linguistic typology, comparative grammar. Survey of major languages and language families of Asia. Diverse Asian languages as subjects of linguistic analysis. Prior knowledge of linguistics not required. Recommended: two years of any Asian language.

ASIAN 404 Writing Systems (3) VLPA *Boltz, Salomon* Origin, nature, and development of writing systems. Alphabets, syllabaries, and logographic systems; relation of writing systems to spoken languages; decipherment of previously undeciphered scripts. Prerequisite: ASIAN 401. Offered: alternate years.

ASIAN 411 Buddhist Literature (5) VLPA/I&S Overview of major Buddhist literary traditions of India, China, and Tibet from antiquity to the end of the first millennium CE. Special focus on Indian Mahayana literature and the historical factors that accompanied its introduction and preservation in China and Tibet. Prerequisite: either RELIG 202, or RELIG 354. Offered: W.

ASIAN 405 Advanced Problems in Asian Linguistics (3) VLPA *Handel, K. Ohta, Shapiro* Advanced problems in the analysis of the languages of east, southeast, south, and central Asia. Includes phonology, morphology, syntax, lexicography, historical reconstruction, linguistic typology, and comparative grammar. Prerequisite: ASIAN 401. Offered: alternate years.

ASIAN 494 Ramayana in Comparative Perspective (5) VLPA *Pauwels* Examines and compares different versions (mainly South Asian) of the Ramayana, including the widely popular television version. Focuses on some famous and controversial passages, with special attention to gender issues. Incorporates background readings from the most recent research. Offered: jointly with SISSA 494.

ASIAN 498 Special Topics (1-5, max. 15) VLPA Offered occasionally by permanent or visiting faculty members. Topics vary. Offered: AWSp.

ASIAN 503 Seminar in Asian Linguistics (1-5, max. 15) Handel, A. Ohta, K. Ohta Topics vary. Prerequisite: permission of instructor. Offered: AWSp.

ASIAN 510 Teaching Assistant Training Workshop (3) A. Ohta Introduction to issues and methods of teaching Asian languages in American college classrooms. Recommended for all new teaching assistants. Prerequisite: concurrent registration in ASIAN 518 and permission of instructor. Offered: A.

ASIAN 518 Foreign Language Teaching Methodology (2) Brandl Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

ASIAN 580 Seminar in Hinduism Studies (5) Pauwels Introduction to the academic study of Hinduism for graduate students. Examines major problems currently addressed in the academic study of Hinduism and the methods used. Provides a historical perspective on past scholarship. Offered: jointly with RELIG 580.

ASIAN 585 Seminar in Buddhism (5) Cox Systems and history of Buddhist thought. Original and secondary sources are used. Combines the methods of specialists in south, central, and east Asian Buddhism with those of historians of religion and philosophy. Prerequisite: permission of instructor. Offered: AWSp.

ASIAN 600 Independent Study or Research (*) Offered: AWSpS.

ASIAN 700 Master's Thesis (*) Offered: AWSpS.

ASIAN 800 Doctoral Dissertation (*) Offered: AWSpS.

Bengali

BENG 311 Elementary Bengali (5) Offers a balance of all four skills: speaking, reading, listening, and writing. Consists of lectures on grammar, drill sections, oral and written exercises, aural comprehension exercises, and readings in elementary level texts. Offered: W.

BENG 312 Elementary Bengali (5) Offers a balance of all four skills: speaking, reading, listening, and writing. Consists of lectures on grammar, drill sections, oral and written exercises, aural comprehension exercises, and readings in elementary level texts. Prerequisite: BENG 311. Offered: W.

BENG 313 Elementary Bengali (5) Offers a balance of all four skills: speaking, reading, listening, and writing. Consists of lectures on grammar, drill sections, oral and written exercises, aural comprehension exercises, and readings in elementary level texts. Prerequisite: BENG 312. Offered: Sp.

BENG 321 Intermediate Bengali (5) VLPA *Salomon* Develops proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an intermediate level. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation and role-play. Prerequisite: BENG 313. Offered: A.

BENG 322 Intermediate Bengali (5) VLPA *Salomon* Develops proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an intermediate level. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation and role-play. Prerequisite: BENG 321. Offered: W.

BENG 323 Intermediate Bengali (5) VLPA *Salomon* Develops proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an intermediate level. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation and role-play. Prerequisite: BENG 322. Offered: Sp.

BENG 401 Advanced Bengali (5) VLPA
Salomon Further development of proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an advanced level with the aim of preparing students to do research. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation. Prerequisite: BENG 323. Offered: A.

BENG 402 Advanced Bengali (5) VLPA
Salomon Further development of proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an advanced level with the aim of preparing students to do research. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation. Prerequisite: BENG 401. Offered: W.

BENG 403 Advanced Bengali (5) VLPA
Salomon Further development of proficiency in reading, writing, listening, and speaking standard colloquial Bengali at an advanced level with the aim of preparing students to do research. Readings in fiction and non-fiction literature, vocabulary and grammar exercises, writing of essays and creative pieces, aural comprehension exercises, and topic-based conversation. Prerequisite: BENG 402. Offered: Sp.

Chinese

CHIN 101 First-Year Chinese (5) Introduction to the standard language. Emphasis on learning correct pronunciation and basic structure. Drill in oral use of the language. Open only to students who do not have any previous training in Chinese. Cannot be taken for credit in combination with CHIN 134. Offered: A.

CHIN 102 First-Year Chinese (5) Introduction to the standard language. Emphasis on learning correct pronunciation and basic structure. Drill in oral use of the language. Open only to students who do not have any previous training in Chinese. Cannot be taken for credit in combination with CHIN 134. Prerequisite: minimum grade of 2.0 in CHIN 101. Offered: W.

CHIN 103 First-Year Chinese (5) Introduction to the standard language. Emphasis on learning correct pronunciation and basic structure. Drill in oral use of the language. Open only to students who do not have any previous training in Chinese. Cannot be taken for credit in combination with CHIN 134. Prerequisite: minimum grade of 2.0 in CHIN 102. Offered: Sp.

CHIN 111 First-Year Chinese (Heritage) (5) Intended for students who have some formal or home training in listening and speaking Mandarin. Focuses on reading comprehension and writing characters in context. Offered: A.

CHIN 112 First-Year Chinese (Heritage) (5) Intended for students who have some formal or home training in listening and speaking Mandarin. Focuses on reading comprehension and writing characters in context. Prerequisite: minimum grade of 2.0 in CHIN 111. Offered: W.

CHIN 113 First-Year Chinese (Heritage) (5) VLPA Intended for students who have some formal or home training in listening and speaking Mandarin. Focuses on reading comprehension and writing characters in context. Prerequisite: minimum grade of 2.0 in CHIN 112. Offered: Sp.

CHIN 121 Accelerated Chinese (10) Covers same material as 111 and 112. In conjunction with 222 and 223, allows completion of two years' language study in one academic year. Cannot be taken for credit in combination with 111 or 112. Offered: A.

CHIN 134 First-Year Intensive Chinese (Non-Heritage) (15) Introduction to the standard language. Emphasis on learning correct pronunciation and basic structure. Drill in oral use of the language. Open only to students who do not have any previous training in Chinese. Cannot be taken for credit in combination with CHIN 101, 122, or 103. Offered: S.

CHIN 138 First-Year Intensive Chinese-Heritage (15) Intended for students who have some formal or home training in listening and speaking Chinese. Focuses on reading, comprehension, and writing characters in context. Offered: S.

CHIN 145 Foreign Study: First-Year Chinese (1-15, max. 20) Modern 100-level Chinese language studied abroad. Evaluation by department/faculty required.

CHIN 201 Second-Year Chinese for Non-Heritage Learners (5) VLPA Continuation of CHIN 103. Advanced grammar and vocabulary expansion stressed. Aural and oral practice and structural drills continued. Cannot be taken for credit in combination with CHIN 234. Prerequisite: minimum grade of 2.0 in either CHIN 103 or CHIN 134. Offered: A.

CHIN 202 Second-Year Chinese for Non-Heritage Learners (5) VLPA Advanced grammar and vocabulary expansion stressed. Oral practice and structural drills continued. Cannot be taken for credit in combination with CHIN 234. Prerequisite: minimum grade of 2.0 in CHIN 201. Offered: W.

CHIN 203 Second-Year Chinese for Non-Heritage Learners (5) VLPA Advanced grammar and vocabulary expansion stressed. Oral practice and structural drills continued. Cannot be taken for credit in combination with CHIN 234. Prerequisite: minimum grade of 2.0 in CHIN 202. Offered: Sp.

CHIN 211 Second-Year Chinese for Heritage Learners (5) VLPA Continuation of 111, 112, 113. Stresses advanced grammar and vocabulary expansion. Continues Aural and oral practice. Cannot be taken for credit in combination with 234. Prerequisite: 2.0 in either CHIN 113 or CHIN 138. Offered: A.

CHIN 212 Second-Year Chinese for Heritage Learners (5) VLPA Continuation of CHIN 211. Stresses advanced grammar and vocabulary expansion. Cannot be taken for credit in combination with CHIN 234. Prerequisite: 2.0 in CHIN 211. Offered: W.

CHIN 213 Second-Year Chinese for Heritage Learners (5) VLPA Continuation of CHIN 212. Stresses advanced grammar and vocabulary expansion. Emphasizes reading and writing. Continues aural and oral practice. Cannot be taken for credit in combination with CHIN 234. Prerequisite: 2.0 in CHIN 212. Offered: Sp.

CHIN 222 Accelerated Chinese (10) VLPA Covers same material as 113 and 211. In conjunction with 121 and 223, allows completion of two years' language study in one academic year. Cannot be taken for credit in combination

with 113 or 211. Prerequisite: CHIN 121. Offered: W.

CHIN 223 Accelerated Chinese (10) VLPA Covers same material as 212 and 213. In conjunction with 121 and 222, allows completion of two years' language study in one academic year. Cannot be taken for credit in combination with 212 or 213. Prerequisite: CHIN 222. Offered: Sp.

CHIN 234 Second-Year Intensive Chinese (15) VLPA Equivalent of 211, 212, 213. Cannot be taken for credit in combination with 211, 212, or 213 taken. Prerequisite: either CHIN 113 or CHIN 134. Offered: S.

CHIN 245 Foreign Study: Second-Year Chinese (1-15, max. 20) VLPA Modern 200-level Chinese language studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 301 Third-Year Chinese, Non-Heritage Track (5) VLPA Focuses on oral and aural proficiency. Covers general topics, reading ability of simple unedited text, as well as writing skill in short essay form. Prerequisite: 2.0 in CHIN 213.

CHIN 302 Third-Year Chinese, Non-Heritage Track (5) VLPA Focuses on oral and aural proficiency. Covers general topics, reading ability of simple unedited text, as well as writing skill in short essay form. Prerequisite: 2.0 in CHIN 301.

CHIN 303 Third-Year Chinese, Non-Heritage Track (5) VLPA Focuses on oral and aural proficiency. Covers general topics, reading ability of simple unedited text, as well as writing skill in short essay form. Prerequisite: 2.0 in CHIN 302.

CHIN 311 Third-Year Chinese for Heritage Learners (5) VLPA Designed for students at the advanced third-year level who wish to improve their speaking, reading, writing, and comprehension skills while increasing knowledge of the culture and the society in which the Chinese language is spoken. Focuses on Chinese as spoken in day-to-day life. Offered: A.

CHIN 312 Third-Year Chinese for Heritage Learners (5) VLPA Designed for students at the advanced third-year level who wish to improve their speaking, reading, writing, and comprehension skills while increasing knowledge of the culture and the society in which the Chinese language is spoken. Focuses on Chinese as spoken in day-to-day life. Offered: W.

CHIN 313 Third-Year Chinese for Heritage Learners (5) VLPA Designed for students at the advanced third-year level who wish to improve their speaking, reading, writing, and comprehension skills while increasing knowledge of the culture and the society in which the Chinese language is spoken. Focuses on Chinese as spoken in day-to-day life. Offered: Sp.

CHIN 342 The Chinese Language (5) VLPA
Handel Nature and structure of the Chinese language, covering structural characteristics, genetic and typological affiliation, standard Mandarin and Chinese dialects, Chinese writing system, history of the Chinese language, and cultural aspects. Prerequisite: either CHIN 103, CHIN 113 or CHIN 134; recommended: either CHIN 201, CHIN 211 or CHIN 234. Offered: W.

CHIN 345 Foreign Study: Third-Year Chinese (1-15, max. 20) VLPA Modern 300-level Chinese language studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 373 Chinese Poetry (5) VLPA Introduction to Chinese poetry. A study of its origins, forms, major themes, and relevant conventions. All readings in English. No knowledge of Chinese required. Offered: W.

CHIN 374 Chinese Prose (5) VLPA *Knechtges* Survey of great works of Chinese prose, including philosophical writings, historical works, short narratives, essays, and rhyme-prose. All readings in English. No knowledge of Chinese required. Offered: Sp.

CHIN 380 Premodern Chinese Narrative in Translation (5) VLPA Premodern Chinese fiction in English translation. Historical and cultural contexts of narrative traditions. Emphasis on the Ming and Ch'ing periods; works and topics vary from year to year. Offered: Sp.

CHIN 381 Literature in Modern China (5) VLPA Twentieth-century Chinese literature in English translation. Introduces the historical and cultural context of modern Chinese writing, as well as various critical approaches to its study.

CHIN 385 Popular Culture in Twentieth-Century China (5) I&S/VLPA Introduction to Chinese popular culture from the turn-of-the-century to the present. Topics include cinema, popular music, and popular fiction; emphasis varies from year to year.

CHIN 395 Foreign Study: Intermediate Chinese Literature or Linguistics (1-15, max. 15) VLPA Intermediate Chinese literature or linguistics studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 411 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: minimum grade of 2.0 in either CHIN 213 or CHIN 303. Offered: A.

CHIN 412 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: minimum grade of 2.0 in CHIN 411. Offered: W.

CHIN 413 Fourth-Year Chinese (5) VLPA *Yue-Hashimoto* Reading of unedited texts including newspaper articles, literary selections, and academic essays. Oral discussion, listening comprehension, and composition. Prerequisite: minimum grade of 2.0 in CHIN 412. Offered: Sp.

CHIN 421 Business Chinese I (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 313. Offered: A.

CHIN 422 Business Chinese II (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 421. Offered: W.

CHIN 423 Business Chinese III (5) VLPA *Chang* Focus on international trade issues of Greater China in the contemporary world. Subjects include international business activities such as trade, banking, marketing, finance, and investment. Prerequisite: CHIN 422. Offered: Sp.

CHIN 443 Structure of Chinese (5) VLPA *Yue-Hashimoto* Outline of the major grammatical structures of Chinese. Focus on learning and teaching problems. Prerequisite: either CHIN 313 or CHIN 334. Offered: W.

CHIN 445 Foreign Study: Fourth-Year Chinese (1-15, max. 20) VLPA Modern 400-level Chinese language studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 451 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: either CHIN 203 or CHIN 213. Offered: A.

CHIN 452 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 451. Offered: W.

CHIN 453 First-Year Classical Chinese (5) VLPA *Boltz* Exercises and selected readings in pre-Han texts. Focus on grammar, systematic sentence analysis, and distinctive functions of grammatical particles. To be taken in sequence. Prerequisite: CHIN 452. Offered: Sp.

CHIN 461 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from earliest times to the end of the Six Dynasties. Offered: A.

CHIN 462 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from the T'ang to the end of the Song. Prerequisite: CHIN 461. Offered: W.

CHIN 463 History of Chinese Literature (5) VLPA *Knechtges* Chinese literature from the Yuan to recent times. Offered: Sp.

CHIN 470 Advanced Readings in Modern Chinese (5) VLPA Reading and translation of scholarly articles and selections in the humanities and social sciences. Prerequisite: CHIN 413. Offered: A.

CHIN 482 Advanced Readings in Modern Chinese (5) VLPA Modern texts in the original, mainly works published since the beginning of the twentieth century. Focus on literature, primarily short story and essay. Offered: W.

CHIN 495 Foreign Study: Advanced Chinese Literature or Linguistics (1-5, max. 15) VLPA Advanced Chinese literature or linguistics studied abroad in approved programs. Evaluation by department/faculty required.

CHIN 496 Special Studies in Chinese (5, max. 15) VLPA Topics vary.

CHIN 499 Undergraduate Research (3-5, max. 15) For Chinese language and literature majors. Offered: AWSpS.

CHIN 531 Studies in Chinese Phonology (3) Handel Sources and methods in the study of Chinese phonology; modern standard Chinese. Prerequisite: ASIAN 401. Offered: A.

CHIN 532 Studies in Chinese Phonology (3) Handel Sources and methods in the study of Chinese phonology; medieval period. Offered: W.

CHIN 533 Studies in Chinese Phonology (3) Handel Sources and methods in the study of Chinese phonology; advanced topics in Chinese historical phonology. Offered: Sp.

CHIN 540 Seminar on Chinese Linguistics (3, max. 9) Handel, Yue-Hashimoto Advanced topics in Chinese linguistics. Subject emphasis varies from year to year. Offered: Sp.

CHIN 541 Seminar in Chinese Grammar (3, max. 9) Boltz, Yue-Hashimoto Problems of theory and analysis of Chinese grammar, both synchronic and diachronic, modern and classical. Prerequisite: CHIN 443.

CHIN 542 Chinese Historical Phonology (3) Handel Introduction to Chinese historical phonology; emphasis on the Middle Chinese period. Prerequisite: ASIAN 401 and permission of instructor.

CHIN 544 Chinese Dialectology (3, max. 9) Yue-Hashimoto Methodology and theory of studying Chinese dialects. Among areas covered are fieldwork methods, dialect classification, and dialectal grammar. Prerequisite: CHIN 542, ASIAN 401, and permission of instructor.

CHIN 551 Second-Year Classical Chinese (5) Knechtges Problems of grammar, rhetoric, and textual criticism. Early literary texts. Offered: A.

CHIN 552 Second-Year Classical Chinese (5) Knechtges Problems of grammar, rhetoric, and textual criticism. Later literary texts. Offered: W.

CHIN 553 Second-Year Classical Chinese (5) Boltz Continuation of 551, 552. Intermediate level readings in Han and pre-Han historical and philosophical texts. Prerequisite: CHIN 551 and CHIN 552. Offered: Sp.

CHIN 554 Readings in Chinese Prose (5) Knechtges Selected readings in the fu of the Han, Wei, Chin, and North-South Dynasties period. Offered: alternate years.

CHIN 555 Readings in Chinese Prose (5) Knechtges Selected readings in parallel prose (*pian* wen). Offered: alternate years.

CHIN 556 Readings in Chinese Prose (5) Knechtges Selected readings in *guwen* prose of the T'ang and Sung periods. Offered: alternate years.

CHIN 557 Introduction to Chinese Philology and Textual Criticism (5) Boltz Principles and methods of textual criticism and philological analysis of ancient Chinese texts. Study of both manuscripts and transmitted texts. Emphasis on Han and pre-Han documents; specific texts vary. Prerequisite: two years of classical Chinese and ASIAN 401. Offered: alternate years; W.

CHIN 558 Seminar in Chinese Lexicology and Grammatonymy (3) Boltz Study of the Chinese script, lexicographical history, and lexicological and etymological analysis. Prerequisite: two years of classical Chinese, ASIAN 401. Offered: alternate years.

CHIN 559 Methods and Materials (5) Knechtges Introduction to the basic reference works and methods of research in Chinese language and literature. Includes a history of Sinology, survey of basic bibliographies, dictionaries, atlases, catalogs, journals, literary collections, concordances, and other sources. Prerequisite: CHIN 551, CHIN 552. Offered: alternate years; A.

CHIN 560 Proseminar in Chinese (3-5) *Boltz, Knechtges* Methods and materials in the study of Chinese texts. Problems in textual analysis and Chinese literary history. Prerequisite: CHIN 553 and one of CHIN 554, CHIN 555, and CHIN 556.

CHIN 561 Studies in Chinese Literature (5) *Knechtges* Literature before Ch'in. Prerequisite: permission of instructor. Offered: W.

CHIN 562 Studies in Chinese Literature (5) *Knechtges* Poetry of the T'ang and Sung periods. Prerequisite: permission of instructor. Offered: Sp.

CHIN 563 Studies in Chinese Literature (5) *Knechtges* Literary theory and criticism. Prerequisite: permission of instructor.

CHIN 573 Seminar in Chinese Poetry (5, max. 15) Directed study of selected works of poetry. Subject emphasis varies each year. Prerequisite: permission of instructor. Offered: alternate years; W.

CHIN 574 Seminar in Six Dynasties Literature (5, max. 15) *Knechtges* Directed study of selected works of Six Dynasties. Subject emphasis varies each year. Prerequisite: permission of instructor. Offered: alternate years; Sp.

CHIN 575 Studies in Chinese Drama (5, max. 15) Readings and discussion of Chinese drama. Subject emphasis varies. Prerequisite: permission of instructor. Offered: alternate years.

CHIN 577 Advanced Readings in Chinese Opera (4) Introduction to the dialogue and verses frequently used in Chinese opera. Comparisons between language spoken daily and languages used in Chinese opera. Prerequisite: CHIN 553 or permission of instructor. Offered: A.

CHIN 578 Advanced Readings in Classical Chinese (4) Study of texts from all periods. Prerequisite: CHIN 553 or permission of instructor. Offered: W.

CHIN 580 Readings in Vernacular Chinese Fiction (5, max. 15) Directed study of selected works of premodern vernacular Chinese narrative, with an emphasis on Ming and Ch'ing fiction. Introduction to various critical approaches to the study of Chinese narrative. Offered: A.

CHIN 582 Topics in Chinese Literature and Cultural Studies (5, max. 15) Directed study of aspects of twentieth-century Chinese literary and popular cultures. Provides both historical coverage and a grounding in various theoretical and methodological problems. Topics include print culture, cinema, popular music, as well as aspects of material culture; emphasis varies. Prerequisite: permission of instructor. Offered: W.

CHIN 583 Seminar in Modern Chinese Literature (5) Directed study of selected works of modern Chinese literature. Primary focus on the novel, short story, and essay. Offered: Sp.

CHIN 590 Readings in the Thirteen Classics (5) *Boltz* Selected readings from the Thirteen Classics, and from their associated exegetic and hermeneutic traditions. Readings and emphases vary from year to year. Prerequisite: two years of Classical Chinese and CHIN 557. Offered: alternate years.

CHIN 591 Studies in the History of Chinese Thought (5) *Knechtges* Directed readings in

selected traditional philosophical texts. Han through T'ang. Prerequisite: permission of instructor.

CHIN 592 Studies in the History of Chinese Thought (5) *Knechtges* Directed readings in selected traditional philosophical texts. Sung and Yuan. Prerequisite: permission of instructor.

CHIN 593 Studies in the History of Chinese Thought (5) *Knechtges* Directed readings in selected traditional philosophical texts. Ming and Ch'ing. Prerequisite: permission of instructor.

Hindi

HINDI 311 Elementary Hindi (5) Modern literary Hindi. Reading, writing, and conversation. Introduction to Devanagari script. Offered: A.

HINDI 312 Elementary Hindi (5) Modern literary Hindi. Reading, writing, and conversation. Introduction to Devanagari script. Prerequisite: HINDI 311. Offered: W.

HINDI 313 Elementary Hindi (5) Modern literary Hindi. Reading, writing, and conversation. Introduction to Devanagari script. Prerequisite: HINDI 312. Offered: Sp.

HINDI 321 Intermediate Hindi (5) VLPA Systematic expansion of vocabulary and grammar. Intermediate-level prose and poetry readings. Oral drills. Prerequisite: HINDI 313. Offered: AS.

HINDI 322 Intermediate Hindi (5) VLPA Systematic expansion of vocabulary and grammar. Intermediate-level prose and poetry readings. Oral drills. Prerequisite: HINDI 321. Offered: WS.

HINDI 323 Intermediate Hindi (5) VLPA Systematic expansion of vocabulary and grammar. Intermediate-level prose and poetry readings. Oral drills. Prerequisite: HINDI 322. Offered: SpS.

HINDI 401 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: A.

HINDI 402 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: W.

HINDI 403 Advanced Hindi (5) VLPA Rapid reading of contemporary Hindi prose, poetry, and drama. Advanced conversation and composition. Offered: Sp.

HINDI 404 Derivational Morphology of Hindi/Urdu (3) VLPA *Shapiro* A systematic introduction to the derivational morphology of Hindi/Urdu. Sanskrit, Persian, Arabic, and English elements in Hindi/Urdu. Treatment of derivational prefixes and suffixes, stem alternations, and methods of compound formation. Prerequisite: HINDI 323. Offered: alternate years; W.

HINDI 421 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative short stories. Prerequisite: HINDI 403.

HINDI 422 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the

present. Readings from representative poems. Prerequisite: HINDI 403.

HINDI 423 Survey of Modern Hindi Literature (3) VLPA *Pauwels, Shapiro* Survey of Hindi literature from the late nineteenth century to the present. Readings from representative novels. Prerequisite: HINDI 403.

HINDI 431 Advanced Conversational Hindi (2, max. 8) VLPA Conversational practice in contemporary Hindi. Prerequisite: HINDI 323. Offered: Sp.

HINDI 451 Advanced Hindi Readings (3, max. 9) VLPA Readings in Modern Standard Hindi prose texts drawn from diverse disciplines. Prerequisite: HINDI 403. Offered: W.

HINDI 499 Undergraduate Research (3-5, max. 15) Primarily for Hindi language and literature majors. Offered: AWSpS.

HINDI 501 Studies in Medieval Braj Literature (3, max. 9) *Pauwels* Introduction to the Braj dialect of Hindi and its literature. Prose readings and selected poetry by Surdas, Raskhan, Bihari, and others. Prerequisite: HINDI 403 or equivalent. Offered: A.

HINDI 502 Studies in Medieval Avadhi Literature (3, max. 9) *Pauwels* Introduction to the Avadhi dialect of Hindi and its literature. Readings from Ramcaritmanas of Tulsidas and Padmavat of Muhammad Malik Jayasi. Prerequisite: HINDI 403 or equivalent. Offered: W.

HINDI 503 Studies in Medieval Sant Literature (3, max. 9) *Shapiro* Introduction to the language and literature of Sant poets. Readings include Guru Nanak's Japuji and excerpts from Kabir's Granthavali. Prerequisite: HINDI 403 or equivalent.

HINDI 504 Studies in Medieval Rajasthani Literature (3) *Pauwels* Introduction to the literary language of Rajasthan. Reading of extracts from representative selections from Rajasthani literature. Prerequisite: HINDI 403 or equivalent.

HINDI 510 Structure of Hindi (3) *Shapiro* Grammatical analysis of Hindi, phonology, syntax, and semantics. Readings from both Western and native grammarians. Prerequisite: HINDI 403 or permission of instructor; recommended: course in linguistics.

Indian

INDN 400 Practicum in South Asian Languages (3, max. 18) VLPA Introduction to any one of various South Asian languages (e.g., Kannada, Nepali, Punjabi, Sinhala, Marathi, Telugu, Urdu) not taught on a regular basis. Students may receive credit for more than one such language.

INDN 401 Pali (3) VLPA *Cox, Salomon* Introduction to Pali language and literature. Prerequisite: SNKRT 303.

INDN 402 Pali (3) VLPA *Cox, Salomon* Introduction to Pali language and literature.

INDN 403 Introduction to Written Urdu (3) VLPA Modern written Urdu for students with at least elementary knowledge of Hindi. Prerequisite: HINDI 313.

INDN 404 Readings in Urdu Literature (3, max. 18) VLPA Readings in Urdu prose and poetry. Urdu prose composition. Prerequisite: INDN 403.

INDN 410 Prakrit (3, max. 6) VLPA *Salomon* Introduction to the various Prakrit or Middle Indo-Aryan dialects (Gandhari, Magadhi, Maharashtri, Sauraseni) from literary, canonical, and inscriptional sources. Prerequisite: SNKRT 303.

INDN 411 First-Year Intensive Bengali (15) Salomon Study of modern Standard Bengali, including reading, writing, and conversation. Introduction to Bengali script. Offered: S.

INDN 499 Undergraduate Research (3-5, max. 15) Primarily for South Asian language and literature majors. Offered: AWSp.

INDN 530 Readings in Pali Literature (3, max. 18) Cox, Salomon Reading and interpretation of intermediate and advanced texts in Pali. Prerequisite: INDN 402 or equivalent.

INDN 590 Special Topics in Indology (1-5, max. 27) Studies in selected research topics in South Asian languages and literatures. Prerequisite: graduate standing and permission of instructor. Offered: Sp.

Indonesian

INDON 111 Elementary Indonesian (5) Introduction to modern standard Indonesian-Malay. Emphasis on grammar and conversational drills. Practice with basic phonological, morphological, and syntactic structures. Offered: A.

INDON 112 Elementary Indonesian (5) Introduction to modern standard Indonesian-Malay. Emphasis on grammar and conversational drills. Practice with basic phonological, morphological, and syntactic structures. Prerequisite: INDON 111. Offered: W.

INDON 113 Elementary Indonesian (5) Introduction to modern standard Indonesian-Malay. Emphasis on grammar and conversational drills. Practice with basic phonological, morphological, and syntactic structures. Prerequisite: INDON 112. Offered: Sp.

INDON 211 Intermediate Indonesian (5) VLPA Continuation of 111, 112, 113. Review/expansion of fundamental grammatical patterns: morphological and syntactic structures, development of conversational skills, reading some literary and cultural materials, writing compositions. Prerequisite: INDON 113. Offered: A.

INDON 212 Intermediate Indonesian (5) VLPA Continuation of 111, 112, 113. Review/expansion of fundamental grammatical patterns: morphological and syntactic structures, development of conversational skills, reading some literary and cultural materials, writing compositions. Prerequisite: INDON 211. Offered: W.

INDON 213 Intermediate Indonesian (5) VLPA Continuation of 111, 112, 113. Review/expansion of fundamental grammatical patterns: morphological and syntactic structures, development of conversational skills, reading some literary and cultural materials, writing compositions. Prerequisite: INDON 212. Offered: Sp.

INDON 311 Advanced Indonesian (5) VLPA Continuation of 211, 212, 213. Expanding vocabulary; preparing for research work using original sources; improving reading fluency in

modern standard written Indonesian using novels, short stories, newspapers, and other authentic materials. Conversation practice centers on discussion of readings. Writing compositions. Prerequisite: INDON 211. Offered: A.

INDON 312 Advanced Indonesian (5) VLPA Continuation of 211, 212, 213. Expanding vocabulary; preparing for research work using original sources; improving reading fluency in modern standard written Indonesian using novels, short stories, newspapers, and other authentic materials. Conversation practice centers on discussion of readings. Writing compositions. Prerequisite: INDON 311. Offered: W.

INDON 313 Advanced Indonesian (5) VLPA Continuation of 211, 212, 213. Expanding vocabulary; preparing for research work using original sources; improving reading fluency in modern standard written Indonesian using novels, short stories, newspapers, and other authentic materials. Conversation practice centers on discussion of readings. Writing compositions. Prerequisite: INDON 312. Offered: Sp.

INDON 499 Undergraduate Research (3-5, max. 15) Primarily for Southeast Asian studies majors.

Japanese

JAPAN 112 First-Year Japanese (0/5, max. 5) Elementary speaking, listening, reading, and writing skills in modern Japanese. Prerequisite: either JAPAN 111 or score of 6-20 on JP 100A placement test. Offered: AW.

JAPAN 113 First-Year Japanese (0/5, max. 5) Elementary speaking, listening, reading, and writing skills in modern Japanese. Prerequisite: either JAPAN 112 or score of 21-40 on JP 100A placement test. Offered: AWSp.

JAPAN 134 First-Year Intensive Japanese (15) Fundamentals of the modern Japanese language. Oral communication skills, basic grammar, and reading/writing of hiragana, katakana, and basic kanji. No initial knowledge of Japanese is presumed. Equivalent of 111, 112, 113. Satisfies requirement for entry to 211. Students with prior background must take placement test. Offered: S.

JAPAN 145 Foreign Study: Elementary Japanese (1-15, max. 20) For participants in study abroad programs in Japan who complete 100-level language courses in approved programs in Japan. Evaluation by department/faculty required.

JAPAN 211 Second-Year Japanese (0/5) VLPA Development of further skills in the spoken and written languages. Students must enroll in both a lecture and quiz section to receive credit. Prerequisite: either JAPAN 113, JAPAN 134, or score of 11-30 on JP200A placement test. Offered: A.

JAPAN 212 Second-Year Japanese (0/5) VLPA Development of further skills in the spoken and written languages. Students must enroll in both a lecture and quiz section to receive credit. Prerequisite: either JAPAN 211 or score of 31-50 on JP200A placement test. Offered: W.

JAPAN 213 Second-Year Japanese (0/5) VLPA Development of further skills in the spoken and

written languages. Students must enroll in both a lecture and quiz section to receive credit. Prerequisite: either JAPAN 212 or score of 51-65 on JP200A placement test. Offered: Sp.

JAPAN 234 Second-Year Intensive Japanese (15) VLPA Equivalent of 211, 212, 213. Satisfies requirements for entry to 311, but recommended primarily for those going to Japan shortly upon completion. Prerequisite: either JAPAN 113, JAPAN 134, or score of 11-30 on JP200A placement test. Offered: S.

JAPAN 245 Foreign Study: Intermediate Japanese (1-15, max. 20) VLPA For participants in study abroad programs in Japan who complete 200-level language courses in approved programs in Japan. Evaluation by department/faculty required.

JAPAN 311 Third-Year Japanese (5) VLPA Intermediate-level skills in both spoken and written languages. Some introduction to unedited materials. Prerequisite: either JAPAN 213, JAPAN 234, or score of 21-45 on JP300A placement test. Offered: AS.

JAPAN 312 Third-Year Japanese (5) VLPA Intermediate-level skills in both spoken and written languages. Some introduction to unedited materials. Prerequisite: either JAPAN 311 or score of 46-75 on JP300A placement test. Offered: WS.

JAPAN 313 Third-Year Japanese (5) VLPA Intermediate-level skills in both spoken and written languages. Some introduction to unedited materials. Prerequisite: either JAPAN 312 or score of 76-90 on JP300A placement test. Offered: SpS.

JAPAN 321 Japanese Literature I (5) VLPA *Atkins* Introduction to the literature and culture of Japan before 1600. Close readings of tales, poems, plays, or essays with an emphasis on understanding cultural and historical contexts. In English. Offered: A.

JAPAN 322 Japanese Literature II (5) VLPA Introduction to the major works of 19th-early 20th century Japan in English translation, with readings of representative fiction, poetry, and criticism, plus films of selected works. In English. Offered: W.

JAPAN 323 Japanese Literature III (5) VLPA Introduction to the major works of contemporary Japan in English translation, with readings that focus on the clash of cultures, generational struggles, and war, plus films that portray these themes and reflect modern Japanese life. In English. Offered: Sp.

JAPAN 342 The Japanese Language (5) VLPA *K. Ohta* Survey of the nature and structure of the Japanese language, covering genetic and typological affiliations, writing systems, lexicon, and features of Japanese sentence structures.

JAPAN 343 Japanese Language in Society (5) I&S/VLPA *A. Ohta* Survey of issues in Japanese language use. Areas covered include dialectal variation, language attitudes, gender differences, and pragmatics.

JAPAN 345 Foreign Study: Advanced Japanese (1-15, max. 20) VLPA For participants in study abroad programs in Japan who complete 300-level language courses in approved programs in Japan. Evaluation by department/faculty required.

JAPAN 360 Topics in Japanese Culture (5) VLPA Focuses on literature from a limited time period or particular aspects of pre-modern or modern Japanese culture.

JAPAN 395 Foreign Study: Japanese Linguistics or Literature (1-20, max. 20) VLPA For participants in study abroad programs in Japan who complete coursework in Japanese literature or linguistics.

JAPAN 421 Fourth-Year Japanese I (5) I&S/ VLPA Reading, class discussion, oral presentations, and composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: 2.5 in JAPAN 313, may not be repeated.

JAPAN 422 Fourth-Year Japanese II (5) I&S/ VLPA Reading, class discussion, oral presentations, and composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: JAPAN 421.

JAPAN 423 Fourth-Year Japanese II (5) I&S/ VLPA Reading, class discussion, oral presentations, and composition on topics related to the Japanese language and present-day Japan. Conducted in Japanese. Prerequisite: JAPAN 422.

JAPAN 428 Advanced Oral Communication (3) VLPA *Iwata* Fourth-year Japanese oral communication skills. Instruction in Japanese. Activities include task-based role-play, speeches, discussions, conversations with native speakers, and study of societal aspects of speech. Prerequisite: JAPAN 313 with a grade of 2.5 or higher. Offered: AW.

JAPAN 429 Advanced Writing in Japanese (3) VLPA *Nishikawa* Focuses on the development of advanced writing and language proficiency in Japanese. Instruction in Japanese. Prerequisite: JAPAN 313 with a grade of 2.5 or higher. Offered: ASp.

JAPAN 431 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax. Prerequisite: 2.5 in JAPAN 313; may not be repeated.

JAPAN 432 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

JAPAN 433 Readings in Modern Japanese Literature (5) VLPA Reading and discussion of selected modern literary texts in the original language, concentrating on the short story. Close attention to grammar and syntax.

JAPAN 440 Introduction to Japanese Linguistics (5) VLPA *A. Ohta, K. Ohta* Overview of major topics in the linguistic description of Japanese: phonology, morphology, syntax, history, dialects, sociolinguistics, and the writing system. Elementary training in phonological, morphological, and syntactic analysis of Japanese. Prerequisite: JAPAN 313; recommended: introductory linguistics course.

JAPAN 443 Topics in Japanese Sociolinguistics (5) I&S/VLPA *A. Ohta* Methodology and theory of sociolinguistic analysis. Reading of research literature and

training in analysis of Japanese language data. Prerequisite: JAPAN 313 which may be taken concurrently; recommended: JAPAN 343.

JAPAN 445 Foreign Study: Fourth-Year Japanese (1-15, max. 20) VLPA For participants in study abroad programs in Japan who complete 400-level language courses in approved programs in Japan. Evaluation by department/faculty required.

JAPAN 451 Readings in Japanese for China and Korea Specialists (5) VLPA .

JAPAN 460 Readings in Japanese Culture (5) VLPA Reading and discussion of texts in Japanese on various aspects of Japanese culture, such as film, anime, art, and other socio-cultural phenomena. Close attention to grammar and syntax. Prerequisite: 2.5 in JAPAN 313.

JAPAN 471 Introduction to Classical Japanese (5) VLPA *Atkins* Introduction to classical Japanese writing system, grammar, and vocabulary. Prerequisite: 2.5 in JAPAN 313; may not be repeated. Offered: A.

JAPAN 472 Readings in Classical Japanese Literature I (5) VLPA *Atkins* Continued study of the classical language with a transition to reading literary works and understanding their cultural contexts. Prerequisite: JAPAN 471. Offered: W.

JAPAN 473 Readings in Classical Japanese Literature (5) VLPA Readings in prose, poetry, and drama, antiquity to nineteenth century. Prerequisite: JAPAN 472. Offered: Sp.

JAPAN 481 Advanced Japanese Through Content (5) VLPA *Ohta* Instruction in Japanese. Dictionary skills in Japanese and Kanji required. Prerequisite: JAPAN 423; recommended: at least one semester of study abroad in Japan (one year desired), or advanced Japanese skills through heritage. Offered: Sp.

JAPAN 499 Undergraduate Research (3-5, max. 15) For Japanese language and literature majors. Offered: AWSpS.

JAPAN 505 Kambun (5) Atkins Introduction to Kambun, a method of reading texts written in Chinese as Classical Japanese. Prerequisite: JAPAN 472; or JAPAN 471 and graduate standing.

JAPAN 531 Advanced Readings in Modern Japanese Literature (5, max. 15) Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

JAPAN 532 Advanced Readings in Modern Japanese Literature (5, max. 15) Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

JAPAN 533 Advanced Readings in Modern Japanese Literature (5, max. 15) Rapid reading of modern literary and critical texts. Prerequisite: JAPAN 433 or equivalent.

JAPAN 540 Seminar on Japanese Linguistics (3, max. 15) *A. Ohta* Problems in the history and structure of the Japanese language. Topics vary each quarter, according to the needs and interests of the students. Prerequisite: JAPAN 440 or permission of instructor.

JAPAN 571 Advanced Readings in Classical Japanese Literature (5) Continued readings in

classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

JAPAN 572 Advanced Readings in Classical Japanese Literature (5) Continued readings in classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

JAPAN 573 Advanced Readings in Classical Japanese Literature (5) Continued readings in classical literary texts. Prerequisite: JAPAN 473 or permission of instructor.

JAPAN 580 Development of Modern Japanese Fiction (5, max. 15) Reading and translation of major works of modern fiction in the original, with emphasis on the chronological development of modern prose style. Offered: A.

JAPAN 590 Seminar in Japanese Literature (5, max. 15) Close examination of selected periods, writers, or genres, including problems of literary criticism in Japanese literature. Prerequisite: permission of instructor. Offered: Sp.

Korean

KOREAN 145 Foreign Study: Elementary Korean (1-15, max. 20) For participants in study abroad programs who complete elementary language courses in approved programs in Korea. Evaluation by department/faculty required.

KOREAN 245 Foreign Study: Intermediate Korean (1-15, max. 20) VLPA For participants in study abroad programs who complete intermediate language courses in approved programs in Korea. Evaluation by department/faculty required.

KOREAN 302 First-Year Korean for Novice Learners (5) Elementary speaking, listening, reading, and writing skills in modern Korean. Open only to students with no formal or informal background in the language. Prerequisite: KOREAN 301. Offered: W.

KOREAN 303 First-Year Korean for Novice Learners (5) Elementary speaking, listening, reading, and writing skills in modern Korean. Open only to students with no formal or informal background in the language. Prerequisite: KOREAN 302. Offered: Sp.

KOREAN 304 Spoken Korean (10) VLPA The Korean language as spoken in ordinary conversational situations. Phonetic accuracy and appropriateness of idiom. May be taken any summer after completion of first-year Korean. Prerequisite: KOREAN 303. Offered: irregularly.

KOREAN 305 First-Year Korean for Heritage Learners (5) Elementary speaking, listening, reading, and writing skills in modern Korean. Open only to students with formal or informal background in the language or to students with Korean heritage. Prerequisite: score of 30-60 on KR100A placement test. Offered: A.

KOREAN 306 First-Year Korean for Heritage Learners (5) Elementary speaking, listening, reading, and writing skills in modern Korean. Open only to students with formal or informal background in the language or to students with Korean heritage. Prerequisite: KOREAN 305. Offered: W.

KOREAN 307 First-Year Korean for Heritage Learners (5) Elementary speaking, listening, reading, and writing skills in modern Korean.

Open only to students with formal or informal background in the language or to students with Korean heritage. Prerequisite: KOREAN 306. Offered: Sp.

KOREAN 311 Second-Year Korean for Novice Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with no formal or informal background in the language prior to first-year Korean at UW. Prerequisite: KOREAN 303 or placement test. Offered: A.

KOREAN 312 Second-Year Korean for Novice Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with no formal or informal background in the language prior to first-year Korean at UW. Prerequisite: KOREAN 311 or placement test. Offered: W.

KOREAN 313 Second-Year Korean for Novice Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with no formal or informal background in the language prior to first-year Korean at UW. Prerequisite: KOREAN 312 or placement test. Offered: Sp.

KOREAN 315 Second-Year Korean for Heritage Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with formal or informal background in the language prior to first-year Korean at the UW. Prerequisite: either score of 0-41 on KR200A placement test or KOREAN 307. Offered: A.

KOREAN 316 Second-Year Korean for Heritage Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with formal or informal background in the language prior to first-year Korean at the UW. Prerequisite: KOREAN 315. Offered: W.

KOREAN 317 Second-Year Korean for Heritage Learners (5) VLPA Development of further skills in the spoken and written languages. Open only to students with formal or informal background in the language prior to first-year Korean at the UW. Prerequisite: KOREAN 316. Offered: Sp.

KOREAN 345 Foreign Study: Advanced Korean (1-15, max. 20) VLPA For participants in study abroad programs who complete advanced language courses in approved programs in Korea. Evaluation by department/faculty required.

KOREAN 411 Readings in Contemporary Korean (5) VLPA Completes the introduction to Korean writing in mixed script of 311, 312, 313. Prerequisite: either minimum score of 42 on KR200A placement test or KOREAN 313. Offered: A.

KOREAN 412 Readings in Contemporary Korean (5) VLPA Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: W.

KOREAN 413 Readings in Contemporary Korean (5) VLPA Provide experience in reading a variety of contemporary styles. Materials from published works include informal essays, short stories, one-act plays, academic essays, and newspaper editorials. Offered: Sp.

KOREAN 415 Social Science Literature in Korean (3) VLPA Readings in selections from contemporary Korean publications in social science topics. Prerequisite: KOREAN 413. Offered: A.

KOREAN 416 Readings in Korean Literature (3) VLPA Reading of various literary texts which may include pre-modern Korean narrative and poetry as well as modern literature and drama. Prerequisite: KOREAN 413. Offered: W.

KOREAN 417 Readings in Korean Journals (3) VLPA Selections from Korean newspapers, news magazines, and other journals. Prerequisite: KOREAN 413. Offered: Sp.

KOREAN 445 Foreign Study: Korean Literature (1-15, max. 20) VLPA For participants in study abroad programs who complete course work Korean literature.

KOREAN 499 Undergraduate Independent Study (3-5, max. 15) For students who have completed 417 or equivalent. Offered: AWSpS.

KOREAN 501 Seminar in Korean Linguistics (3-5) Topics in Korean linguistics. Prerequisite: background in linguistics and permission of instructor.

KOREAN 502 Seminar in Korean Linguistics (3-5) Topics in Korean linguistics. Prerequisite: background in linguistics and permission of instructor.

KOREAN 503 Seminar in Korean Linguistics (3-5) Topics in Korean linguistics. Prerequisite: background in linguistics and permission of instructor.

KOREAN 531 Advanced Readings in Modern Korean Literature (5) Literature and literary criticism in Korean. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

KOREAN 532 Advanced Readings in Traditional Vernacular Korean Literature (5) Readings in traditional Korean vernacular literature, including poetry, sung narrative, and fiction. Prerequisite: fourth-year Korean or equivalent. Offered: alternate years.

Sanskrit

SNKRT 301 Introduction to Sanskrit (5) Cox, Salomon Basic grammar and vocabulary of the classical language. Reading of elementary texts from the epic or Puranic literature. Offered: A.

SNKRT 302 Introduction to Sanskrit (5) Cox, Salomon Basic grammar and vocabulary of the classical language. Reading of elementary texts from the epic or Puranic literature. Prerequisite: SNKRT 301. Offered: W.

SNKRT 303 Introduction to Sanskrit (5) Cox, Salomon Basic grammar and vocabulary of the classical language. Reading of elementary texts from the epic or Puranic literature. Prerequisite: SNKRT 302. Offered: Sp.

SNKRT 401 Intermediate Sanskrit (5) VLPA Cox, Salomon Further study of classical grammar; introduction to classical literature and Vedic language and texts. Prerequisite: SNKRT 303. Offered: A.

SNKRT 402 Intermediate Sanskrit (5) VLPA Cox, Salomon Further study of classical

grammar; introduction to classical literature and Vedic language and texts. Offered: W.

SNKRT 403 Intermediate Sanskrit (5) VLPA Cox, Salomon Further study of classical grammar; introduction to classical literature and Vedic language and texts. Offered: Sp.

SNKRT 411 Advanced Sanskrit (3, max. 9) VLPA Cox, Salomon Reading and analysis of classical texts, chosen according to students' interests. Prerequisite: SNKRT 403. Offered: A.

SNKRT 412 Advanced Sanskrit (3, max. 9) VLPA Cox, Salomon Reading and analysis of classical texts, chosen according to students' interests. Offered: W.

SNKRT 413 Advanced Sanskrit (3, max. 9) VLPA Cox, Salomon Reading and analysis of classical texts, chosen according to students' interests. Offered: Sp.

SNKRT 491 Vedic Studies (3) VLPA Salomon Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture. Prerequisite: SNKRT 303.

SNKRT 492 Vedic Studies (3) VLPA Salomon Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture.

SNKRT 493 Vedic Studies (3) VLPA Salomon Readings of selected Vedic texts, with linguistic, religious, and historical analyses. Includes background material on Vedic religion, literature, and culture.

SNKRT 494 Readings in Religious Classics of India (5) VLPA Reading and analysis of the older religious brahmanical texts. Prerequisite: SNKRT 402.

SNKRT 495 Studies in Indian Thought (3, max. 9) VLPA Cox Religious and philosophical traditions in South Asia. The original documents studied vary from year to year. Prerequisite: SNKRT 402.

SNKRT 499 Undergraduate Research (3-5, max. 15) Primarily for Sanskrit language and literature majors. Offered: AWSp.

SNKRT 550 Seminar on Sanskrit Literature (3, max. 9) Salomon Detailed study of selected authors, periods, or traditions, within the context of Indian literary history. Prerequisite: SNKRT 403 or permission of instructor.

SNKRT 555 Seminar on Sanskrit Grammar (3, max. 6) Salomon Reading and critical study of traditional literature on grammar and language, including texts of Paninian and other schools. Offered: A.

SNKRT 560 Readings in Philosophical Sanskrit (3, max. 9) Cox, Potter, Salomon Intensive reading and analysis of Hindu or Buddhist philosophical texts. Prerequisite: SNKRT 494 or permission of instructor. Offered: AWSp.

SNKRT 570 Seminar in Indian Epigraphy and Paleography (3, max. 6) Salomon Introduction to the study of inscriptions and other original documents in Sanskrit and Prakrit languages and in Kharosthi, Brahmi, and derived scripts. History of writing in India and development of Indic

scripts. Methods of critical evaluation of inscriptions as sources of political and cultural history. Prerequisite: SNKRT 403.

SNKRT 581 Readings in Buddhist Texts (3, max. 9) Cox Interpretation of original sources. Texts vary from year to year. Prerequisite: ability to study sources in the original languages, an introduction to Buddhist thought, and permission of instructor.

SNKRT 582 Readings in Buddhist Texts (3, max. 9) Cox Interpretation of original sources. Texts vary from year to year. Prerequisite: ability to study sources in the original languages, an introduction to Buddhist thought, and permission of instructor.

Thai

THAI 145 Foreign Study: Elementary Thai (1-15, max. 20) For participants in study abroad programs who complete elementary language courses in approved programs in Thailand. Evaluation by department faculty required.

THAI 245 Foreign Study: Intermediate Thai (1-15, max. 20) VLPA For participants in study abroad programs who complete intermediate language courses in approved programs in Thailand. Evaluation by department faculty required.

THAI 301 Beginning Thai (5) *Kesavatana-Dohrs* Introduction to modern spoken and written Thai. Emphasis on spoken language competence with additional skills in elementary reading and writing. Designed for students with no prior knowledge of Thai. Offered: A.

THAI 302 Beginning Thai (5) *Kesavatana-Dohrs* Introduction to modern spoken and written Thai. Emphasis on spoken language competence with additional skills in elementary reading and writing. Designed for students with no prior knowledge of Thai. Prerequisite: THAI 301. Offered: W.

THAI 303 Beginning Thai (5) *Kesavatana-Dohrs* Introduction to modern spoken and written Thai. Emphasis on spoken language competence with additional skills in elementary reading and writing. Designed for students with no prior knowledge of Thai. Prerequisite: THAI 302. Offered: Sp.

THAI 345 Foreign Study: Advanced Thai (1-15, max. 20) VLPA For participants in study abroad programs who complete 300-level language courses in approved programs in Thailand. Evaluation by department faculty required.

THAI 401 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Continuation of 303. Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 303. Offered: A.

THAI 402 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 401. Offered: W.

THAI 403 Intermediate Thai (5) VLPA *Kesavatana-Dohrs* Expands students' abilities in the four language skills of listening, speaking, reading, and writing. Prerequisite: THAI 402. Offered: Sp.

THAI 410 Accelerated Reading and Writing (5) VLPA *Kesavatana-Dohrs* Accelerated Thai for

fluent speakers who do not read or write Thai. Emphasis on reading and writing through Intermediate Thai. Credit/no credit only.

THAI 411 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 403. Offered: A.

THAI 412 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 411. Offered: W.

THAI 413 Readings in Thai (3-5, max. 15) VLPA *Kesavatana-Dohrs* Advanced reading and translation of selections from various Thai authors, with occasional practice in conversation and composition. Prerequisite: THAI 412. Offered: Sp.

THAI 499 Undergraduate Research (3-5, max. 25) For Thai language and literature majors. Offered: AWSp.

Urdu

URDU 311 Elementary Urdu (5) Modern literary Urdu. Reading, writing, conversation, and listening comprehension. Introduction to Perso-Arabic script.

URDU 312 Elementary Urdu (5) Modern literary Urdu. Reading, writing, conversation, and listening comprehension. Introduction to Perso-Arabic script. Prerequisite: URDU 311.

URDU 313 Elementary Urdu (5) Modern literary Urdu. Reading, writing, conversation, and listening comprehension. Introduction to Perso-Arabic script. Prerequisite: URDU 312.

URDU 321 Intermediate Urdu (5) Systematic expansion of vocabulary and grammar. Intermediate level prose and poetry readings. Expansion of skills in reading, writing, speaking, and listening comprehension. Prerequisite: URDU 313.

URDU 322 Intermediate Urdu (5) Systematic expansion of vocabulary and grammar. Intermediate level prose and poetry readings. Expansion of skills in reading, writing, speaking, and listening comprehension. Prerequisite: URDU 321.

URDU 323 Intermediate Urdu (5) Systematic expansion of vocabulary and grammar. Intermediate level prose and poetry readings. Expansion of skills in reading, writing, speaking, and listening comprehension. Prerequisite: URDU 322.

URDU 401 Advanced Urdu (5) Rapid reading of contemporary Urdu prose and poetry. Advanced conversation and composition. Prerequisite: URDU 323.

URDU 402 Advanced Urdu (5) Rapid reading of contemporary Urdu prose and poetry. Advanced conversation and composition. Prerequisite: URDU 401.

URDU 403 Advanced Urdu (5) Rapid reading of contemporary Urdu prose and poetry. Advanced conversation and composition. Prerequisite: URDU 402.

Vietnamese

VIET 111 First-Year Vietnamese (5) *Nguyen* Introduction to modern Vietnamese conversation. Emphasis on correct pronunciation, spelling, and sentence structure. Designed for students with no previous exposure to Vietnamese. Offered: A.

VIET 112 First-Year Vietnamese (5) *Nguyen* Introduction to modern Vietnamese conversation. Emphasis on correct pronunciation, spelling, and sentence structure. Designed for students with no previous exposure to Vietnamese. Prerequisite: VIET 111. Offered: W.

VIET 113 First-Year Vietnamese (5) *Nguyen* Introduction to modern Vietnamese conversation. Emphasis on correct pronunciation, spelling, and sentence structure. Designed for students with no previous exposure to Vietnamese. Prerequisite: VIET 112. Offered: Sp.

VIET 145 Foreign Study: Elementary Vietnamese (1-15, max. 20) For participants in study abroad programs who complete elementary language courses in approved programs in Vietnam. Evaluation by department faculty required.

VIET 211 Second-Year Vietnamese (5) VLPA *Nguyen* Continuation of 113. Development of conversation skills, reading for comprehension, and writing short compositions. Prerequisite: VIET 113. Offered: A.

VIET 212 Second-Year Vietnamese (5) VLPA *Nguyen* Development of conversation skills, reading for comprehension, and writing short compositions. Prerequisite: VIET 211. Offered: W.

VIET 213 Second-Year Vietnamese (5) VLPA *Nguyen* Development of conversation skills, reading for comprehension, and writing short compositions. Prerequisite: VIET 212. Offered: Sp.

VIET 214 Accelerated Vietnamese Reading and Writing (5) VLPA *Nguyen* Accelerated course for fluent speakers who do not read or write Vietnamese. Emphasis on reading and writing through second-year level. Cannot be taken for credit in combination with any formal Vietnamese course. Credit/no credit only. Offered: AWSp.

VIET 245 Foreign Study: Intermediate Vietnamese (1-15, max. 20) VLPA For participants in study abroad programs who complete intermediate language courses in approved programs in Vietnam. Evaluation by department faculty required.

VIET 345 Foreign Study: Advanced Vietnamese (1-15, max. 20) VLPA For participants in study abroad programs who complete 300-level language courses in approved programs in Vietnam. Evaluation by department faculty required.

VIET 496 Special Studies in Vietnamese (3-5, max. 15) VLPA *Nguyen* Topics vary. Emphasizes improving language skills for research. Primarily for Southeast Asian Studies majors. Offered: AWSp.

Astrobiology

ASTBIO 115 Astrobiology: Life in the Universe (5) NW, QSR Introduction to the new science of astrobiology, study of the origin and evolution of life on Earth, and the search for microbial and intelligent life elsewhere in the Universe. Designed for non-science, liberal arts majors. Offered: jointly with ASTR/BIOL/ESS/OCEAN 115.

ASTBIO 501 Astrobiology Disciplines (4) Review of research and subject matter relevant to astrobiology from within the disciplines of biology, astronomy, oceanography, atmospheric science, chemistry, planetary science, and geology.

ASTBIO 502 Astrobiology Topics (4) Investigation in detail of research topics of current interest.

Astronomy

ASTR 101 Astronomy (5) NW, QSR Introduction to the universe, with emphasis on conceptual, as contrasted with mathematical, comprehension. Modern theories, observations; ideas concerning nature, evolution of galaxies; quasars, stars, black holes, planets, solar system. Not open for credit to students who have taken 102 or 201; not open to upper-division students majoring in physical sciences or engineering.

ASTR 102 Introduction to Astronomy (5) NW, QSR Emphasis on mathematical and physical comprehension of nature, the sun, stars, galaxies, and cosmology. Designed for students who have had algebra and trigonometry and high school or introductory level college physics. Cannot be taken for credit in combination with ASTRO 101 or ASTRO 301.

ASTR 115 Astrobiology: Life in the Universe (5) NW Introduction to the new science of astrobiology, study of the origin and evolution of life on Earth, and the search for microbial and intelligent life elsewhere in the Universe. Designed for non-science, liberal arts majors. Offered: jointly with ASTBIO/ESS/OCEAN 115/BIOL 114.

ASTR 150 The Planets (5) NW, QSR For liberal arts and beginning science students. Survey of the planets of the solar system, with emphases on recent space exploration of the planets and on the comparative evolution of the Earth and the other planets.

ASTR 190 Modern Topics in Astronomy for Non-Science Majors (3/5, max. 10) NW Topics of current interest, such as origin of chemical elements, novae and supernovae, white dwarfs, neutron stars, black holes, active galaxies, quasars, or interstellar medium and astrochemistry. Choice of topics depends on instructor and class interest. Prerequisite: either one 100- or one 200-level ASTR course.

ASTR 201 The Universe and the Origin of Life (5) NW, QSR Sequel to 101 or 102, emphasizing modern views of the atomic and molecular evolution of the universe from the initial "big bang" through the formation of the solar system and the emergence of biological forms on the earth. The latter part of the course considers questions about the existence of, and communication with, extraterrestrial intelligent life, and finally the ultimate fate of the cosmos.

ASTR 210 Distance and Time: Size and Age in the Universe (5) NW, QSR Space and time as basic concepts in physical science. How we define and measure them, how the concepts have developed over the centuries, and how modern measurements allow us to determine the size and age of the universe.

ASTR 211 The Universe and Change (5) NW, QSR Gravity as central to the form and evolution of the universe. Conceptual formulation of gravity from the Renaissance to Einstein. Its consequences from the falling of an apple to the slowing of the expansion of the universe.

ASTR 212 Life in the Universe (5) NW, QSR Nature and origin of cosmic large numbers. Steps to the formation of life, formation of planets (stars, galaxies, a long-lived universe), the anthropic principle. Searches for other planetary systems and extraterrestrial life.

ASTR 270 Public Outreach in Astronomy (3) NW/VLPA Emphasis is on giving effective scientific presentations, developing and giving educational programs to school-age groups, and communicating your knowledge of astronomy to others. Give talks at the Jacobsen Observatory on campus and presentations in the Astronomy Department's planetarium. Learn to operate a telescope and the planetarium equipment. Prerequisite: one astronomy course at either the 100-, 200-, or 300-level. Offered: A.

ASTR 301 Astronomy for Scientists and Engineers (3) NW Introduction to astronomy for students in the physical sciences or engineering. Topics similar to 101, but the approach uses more mathematics and physics. Prerequisite: PHYS 123.

ASTR 313 Science in Civilization: Physics and Astrophysics Since 1850 (5) I&S/NW Organization and pursuit of the physical and astrophysical sciences, focusing on the major unifying principles of physics and astronomy and the social and cultural settings in which they were created. Offered: jointly with HIST 313.

ASTR 321 The Solar System (3) NW Solar system; planetary atmospheres, surfaces and interiors, the moon, comets. The solar wind and interplanetary medium. Formation of the solar system. Prerequisite: PHYS 224 which may be taken concurrently.

ASTR 322 The Contents of Our Galaxy (3) NW Introduction to astronomy. Basic properties of stars, stellar systems, interstellar dust and gas, and the structure of our galaxy. Prerequisite: PHYS 224 which may be taken concurrently; PHYS 225 which may be taken concurrently.

ASTR 323 Extragalactic Astronomy and Cosmology (3) NW Galaxies, optical and radio morphology and properties. Clusters of galaxies, radio sources, and quasars. Observational cosmology. Prerequisite: ASTR 322 which may be taken concurrently.

ASTR 421 Stellar Observations and Theory (3) NW Observations and theory of the atmosphere, chemical composition, internal structure, energy sources, and evolutionary history of stars. Prerequisite: ASTR 322.

ASTR 422 Interstellar Material (3) NW Description and physics of the matter between the stars. Physical conditions, distribution, evolution, and motions of interstellar atoms, molecules, and dust grains. Exchange of energy

and matter between stars and interstellar material.

ASTR 423 High-Energy Astrophysics (3) NW High-energy phenomena in the universe. Includes supernova, pulsars, neutron stars, x-ray and gamma-ray sources, black holes, cosmic rays, quasi stellar objects, active galactic nuclei, diffuse background radiations. Radiative emission, absorption processes, and models derived from observational data. Prerequisite: PHYS 224; PHYS 225.

ASTR 480 Introduction to Astronomical Data Analysis (5) NW Hands-on experience with electronic imaging devices (CCDs) and software for image reduction and analysis. Introduction to operating systems, reduction software, and statistical analysis with applications to CCD photometry. Prerequisite: ASTR 323, which may be taken concurrently.

ASTR 481 Introduction to Astronomical Observation (5) NW Theory and practice of obtaining optical data at a telescope. Preparation, obtaining data with a CCD on a telescope, and subsequent data analysis for completion of a research project. Prerequisite: ASTR 480.

ASTR 482 Writing Astronomical Papers (2) Szkody Principles of organizing, developing, and writing astronomical research papers for journals and astronomy articles for general public interest. Prerequisite: ASTR 481 or ASTR 499, either of which may be taken concurrently. Offered: Sp.

ASTR 497 Topics in Current Astronomy (1-3, max. 9) NW Recent developments in one field of astronomy or astrophysics.

ASTR 499 Undergraduate Research (*, max. 15) Special astronomical problems and observational projects, by arrangement with instructor.

ASTR 508 Physical Foundations of Astrophysics II (3) Introduction to astronomical hydrodynamics and magnetohydrodynamics, basic theorems and application to stellar and interstellar magnetic fields. Introduction to plasma physics, waves in a plasma.

ASTR 509 Physical Foundations of Astrophysics III (3) Potential theory as applied to astrophysical systems. Orbits. Integrals of motion. Equilibrium and stability of stellar systems. Encounters of stellar systems. Kinetic theory of collisional systems. Applications of stellar dynamics to star clusters, galaxies, and large-scale structure.

ASTR 510 Nuclear Astrophysics (3) Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with PHYS 554; A.

ASTR 511 Galactic Structure (3) Kinematics, dynamics, and contents of the galaxy. Spiral structure. Structure and evolution of galaxies.

ASTR 512 Extragalactic Astronomy (3) Types of galaxies. Integrated properties, content, and dynamics. Extragalactic distance scale, groups and clusters. Radio sources. Observational cosmology.

ASTR 513 Cosmology and Particle Astrophysics (3) Big bang cosmology; relativistic world

models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with PHYS 555.

ASTR 519 Radiative Processes in Astrophysics (3) Theory and applications of astrophysical radiation processes: transfer theory; thermal radiation; theory of radiation fields and radiation from moving charges; bremsstrahlung; synchrotron; Compton scattering; plasma effects.

ASTR 521 Stellar Atmospheres (3) Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 421 or equivalent.

ASTR 522 Stellar Atmospheres (3) Theory of continuous radiation and spectral line formation. Applications to the sun and stars. Prerequisite: PHYS 421 or equivalent.

ASTR 523 Solar Physics (3) Sun as a star, solar photosphere and outer convection zone, granulation and related phenomena, solar chromosphere, and corona, solar activity (especially sunspots and solar flares), sun's radio emission, solar-terrestrial relations.

ASTR 531 Stellar Interiors (4) Physical laws governing the temperature, pressure, and mass distribution in stars. Equation of state, opacity, nuclear energy generation, computational methods. Models of main sequence stars and star formation. Prerequisite: PHYS 421 or equivalent.

ASTR 532 Stellar Evolution (3) Theoretical and observational approaches to stellar evolution. Structure of red giants, supernovae, and white dwarfs. Observations of star clusters and the chemical composition of stars as they relate to the theory of stellar structure. Prerequisite: ASTR 531.

ASTR 541 Interstellar Matter (3) Physical conditions and motions of neutral and ionized gas in interstellar space. Interstellar dust, magnetic fields, formation of grains, clouds, and stars. Prerequisite: modern physics or permission of instructor.

ASTR 555 Planetary Atmospheres (3) Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. Offered: jointly with ATM S 555/ESS 581.

ASTR 556 Planetary Surfaces (3) Comparison of surface processes and conditions on Mercury, Venus, Earth, moon, Mars, asteroids, and satellites of the great planets. Emphasis on understanding how and why planetary surfaces differ from one another and the implied course of solar-system evolution. Analysis of data from Earth-based telescopes and manned and unmanned space missions.

ASTR 557 Origin of the Solar System (3) Nebular and nonnebular theories of the solar system origin; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; physical and chemical

evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ESS 583.

ASTR 561 High Energy Astrophysics (3) Observed properties of supernovae, x-ray stars, radio sources, quasars. Theories explaining such objects. Origin of cosmic rays.

ASTR 575 Seminar in Astronomy (1-2, max. 20) Discussion of recent research in astronomy and astrophysics. Credit/no credit only. Prerequisite: permission of department.

ASTR 576 Astronomy Colloquium (1, max. 20) Current research topics in astronomy and astrophysics. Credit/no credit only. Prerequisite: permission of department.

ASTR 581 Techniques in Optical Astronomy (5) Theory and practice of obtaining optical data. Astronomical photoelectric photometers, spectrographs, interferometers, CCDs, and infrared equipment. Data-reduction techniques with emphasis on statistical analysis using digital computers. Observations with MRO thirty-inch telescope.

ASTR 597 Topics in Observational Astrophysics (1-5, max. 20) .

ASTR 598 Topics in Theoretical Astrophysics (1-5, max. 20) .

ASTR 599 Advanced Astronomy Seminar (1-3, max. 6) Practical exercises in astrophysics. Emphasis on methods and techniques of simulation, acquisition, evaluation, and analysis of observational data and its interpretation using models of astrophysical systems. Prerequisite: permission of instructor.

ASTR 600 Independent Study or Research (*) .

ASTR 700 Master's Thesis (*) .

ASTR 800 Doctoral Dissertation (*) .

Atmospheric Sciences

ATM S 101 Weather (5) NW The earth's atmosphere, with emphasis on weather observations and forecasting. Daily weather map discussions. Highs, lows, fronts, clouds, storms, jet streams, air pollution, and other features of the atmosphere. Physical processes involved in weather phenomena. Intended for nonmajors. Offered: AWWSp.

ATM S 211 Climate and Climate Change (5) NW The nature of the global climate system. Factors influencing climate including interactions among the atmosphere, oceans, solid earth, and biosphere. Stability and sensitivity of climate system. Global warming, ozone depletion, and other human influences. Intended for nonmajors. Offered: AWWSp.

ATM S 212 Air Pollution: From Urban Smog to the Ozone Hole (5) NW *Alexander, Jaegle, Thornton* Introduction to air pollution on local, regional, and global scales, with focus on the sources, transformation, and dispersion of pollutants responsible for urban smog, acid rain, climate change, and the ozone hole. Health and environmental effects of air pollutants, technological solutions, and international policy regulations. Offered: AWWSp.

ATM S 321 Physical Climatology (3) NW Evolution and present state of earth's climate. Emphasis on physical processes determining the climate of the earth's atmosphere and surface: radiative transfer, energy balance, hydrologic cycle, atmospheric and oceanic energy transport. Factors controlling climate change. Prerequisite: ATM S 301. Offered: Sp.

ATM S 340 Introduction to Thermodynamics and Cloud Processes (5) NW Thermodynamics and hydrostatics. Cloud and precipitation processes with emphasis on the microphysics. Prerequisite: either MATH 126, MATH 129, or MATH 136. Offered: W.

ATM S 358 Fundamentals of Atmospheric Chemistry (3) NW Review of basic principles of physical chemistry; evolution and chemical composition of earth's atmosphere; half-life, residence and renewal time; sources, transformation, transport and sinks of gases in the troposphere; atmospheric aerosols; chemical cycles; air pollution; stratospheric chemistry. Recommended: CHEM 142. Offered: Sp.

ATM S 370 Atmospheric Structure and Analysis (5) NW Structure and evolution of extratropical cyclones, fronts and convective systems. Surface and upper air analysis techniques. Radar and satellite data. Real-world applications of basic dynamical principles. Introduction to operational products and forecasting. Prerequisite: ATM S 301. Offered: W.

ATM S 390 Honors Tutorial in Atmospheric Sciences (*, max. 6) Review and discussion of selected problems in atmospheric sciences. Introduction to research methods. Presentation of a research paper. Offered: AWWSp.

ATM S 431 Atmospheric Physics (5) NW Energy transfer processes: solar and atmospheric radiation, turbulence, and boundary layer structure. Applications. Prerequisite: either ATM S 340 or PHYS 224. Offered: A.

ATM S 441 Atmospheric Motions I (3) NW Basic equations governing atmospheric motions and their elementary applications; circulation and vorticity; dynamics of midlatitude disturbances. Prerequisite: either AMATH 353 or MATH 309; MATH 324. Offered: A.

ATM S 442 Atmospheric Motions II (5) NW Wave dynamics, numerical prediction, development of midlatitude synoptic systems, and general circulation. Includes laboratory exercises. Prerequisite: ATM S 441. Offered: W.

ATM S 451 Instruments and Observations (5) NW Principles of operating instruments for measuring important atmospheric parameters (e.g., temperature, humidity, aerosol concentration). Concepts of sensitivity, accuracy, representativeness, time response. Manipulation of output data including signal processing and statistical analysis. Experimental design and implementation of the design in actual field experiments is included. Prerequisite: ATM S 370; ATM S 442; STAT 311. Offered: Sp.

ATM S 452 Weather Forecasting and Advanced Synoptic Meteorology (5) NW Basic forecasting techniques. Application of numerical modeling and statistical approaches. Structure, evolution, and forecasting of convective systems. Radar applications. Diurnal and topographically-forced circulations. Aviation meteorology. Laboratories include extensive practice in forecasting and surface map analysis.

Prerequisite: ATM S 370; ATM S 442; STAT 311.
Offered: Sp.

ATM S 458 Global Atmospheric Chemistry (4)

NW Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with CHEM 458; A.

ATM S 460 Water in the Environment (3) NW

Baker, Raymond, Waddington, Warren
Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ESS 424/PHYS 460. Offered: A.

ATM S 480 Air-Quality Modeling (3) NW

Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Offered: jointly with CEE 480; W.

ATM S 490 Current Weather Analysis (1, max. 6) NW

Reviews and analyzes current weather situations and forecasts. Promotes active discussion between the leader and attendees, and provides exposure to practical aspects of forecasting, the structure of synoptic and local weather phenomena, and applications of basic meteorological concepts. Offered: A/WSp.

ATM S 492 Readings in Meteorology or Climatology (*) Credit/no credit only. Offered: A/WSpS.

ATM S 501 Fundamentals of Physics and Chemistry of the Atmosphere (5)

Fundamentals of hydrostatics, thermodynamics, radiation, cloud physics, and atmospheric chemistry. Offered: A.

ATM S 502 Introduction to Synoptic Meteorology (3)

Overview of weather systems; atmospheric observations and data assimilation. Elementary manual and computer-aided synoptic analysis techniques. Interpretation of satellite and ground-based observations. Kinematics. Fronts and frontogenesis; life cycles of extratropical cyclones; related mesoscale phenomena. Numerical weather prediction; interpretation of forecast products. Offered: Sp.

ATM S 503 Atmospheric Motions I (3) Basic equations governing atmospheric motions and their elementary applications; circulation and vorticity; dynamics of midlatitude disturbances. Offered: A.

ATM S 504 Atmospheric Motions II (5) Wave dynamics, numerical prediction, development of midlatitude synoptic systems, and general circulation. Prerequisite: either ATM S 441 or ATM S 503. Offered: W.

ATM S 505 Introduction to Fluid Dynamics (4)

Eulerian equations for mass, motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress, strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high, low Reynolds numbers; boundary layers,

introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH 505/OCEAN 511; A.

ATM S 508 Geochemical Cycles (4)

Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523/CHEM 523; Sp.

ATM S 509 Geophysical Fluid Dynamics I (4)

Dynamics of rotating stratified fluid flow in the atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincare, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasigeostrophy. Prerequisite: ATM S/AMATH 505/OCEAN 511. Offered: jointly with OCEAN 512; W.

ATM S 510 Physics of Ice (3)

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Offered: jointly with ESS 531; alternate years; W.

ATM S 511 Formation of Snow and Ice Masses (3)

Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with ESS 532; alternate years; A.

ATM S 512 Dynamics of Snow and Ice Masses (3)

Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with ESS 533; alternate years; Sp.

ATM S 513 Structural Glaciology (3)

Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with ESS 534; alternate years; W.

ATM S 514 Ice and Climate Modeling (3)

Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with ESS 535; alternate years.

ATM S 520 Atmospheric Sciences Colloquium (1, max. 15)

Seminars on current research in advanced topics related to atmospheric sciences, conducted by faculty and visiting professors/scientists. Includes presentation of doctoral dissertations by department graduate students.

For Atmospheric Sciences graduate students only. Credit/no credit only. Prerequisite: permission of department. Offered: A/WSp.

ATM S 521 Seminar in Atmospheric Dynamics (*)

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

ATM S 523 Seminar in Clouds and Precipitation (*)

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/W.

ATM S 524 Seminar in Climate Dynamics and Energy Transfer (*)

Directed at current research in the subject. For advanced students. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

ATM S 525 Seminar Topics in Atmospheric Chemistry (1-3, max. 6)

Seminar for atmospheric scientists, chemists, and engineers in problems associated with the chemical composition of the atmosphere. Topics range from the natural system to urban pollution and global atmospheric change. Faculty lectures and student participation. Prerequisite: CEE 301 or permission of instructor. Offered: jointly with CEE 553; W.

ATM S 532 Atmospheric Radiation: Introductory (3)

Fundamentals of radiative transfer; absorption and scattering by atmospheric gases; elementary applications to constraints on the thermal structure, photochemistry, and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with ESS 571; Sp.

ATM S 533 Atmospheric Radiation: Advanced (3)

Optical properties and particle absorption and scattering; solutions of radiative transfer equation in multiple scattering atmospheres; applications to atmospheric and surface energy balance and remote sensing. Prerequisite: ATM S 532/ESS 571 or permission of instructor. Offered: jointly with ESS 572; A.

ATM S 534 Remote Sensing of the Atmosphere and Climate System (3)

Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications to research. Prerequisite: ATM S 532 or ATM S 533. Offered: jointly with ESS 521; alternate years.

ATM S 535 Cloud Microphysics and Dynamics (3)

Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with ESS 573; W.

ATM S 536 Mesoscale Storm Structure and Dynamics (3)

Techniques of observing storm structure and dynamics by radar and aircraft, observed structures of precipitating cloud systems, comparison of observed structures with cloud models. Prerequisite: either ATM S 535 or ESS 573. Offered: alternate years; Sp.

ATM S 542 Synoptic and Mesoscale Dynamics (3)

Quasi-geostrophic theory, baroclinic instability, symmetric instability, tropical disturbances, frontogenesis, orographic disturbances, convective storms. Prerequisite: ATM S 509/OCEAN 512 and AMATH 402 or equivalents. Offered: Sp.

ATM S 545 General Circulation of Atmosphere (3) Requirements of the global angular momentum, heat, mass, and energy budgets upon atmospheric motions as deduced from observations. Study of the physical processes through which these budgets are satisfied. Prerequisite: ATM S 509/OCEAN 512 or permission of instructor. Offered: A.

ATM S 547 Boundary Layer Meteorology (3) Turbulence, turbulent fluxes, averaging. Convection and shear instability. Monin-Obukhov similarity theory, surface roughness. Wind profiles. Organized large eddies. Energy fluxes at ocean and land surfaces, diurnal cycle. Convective and stably stratified boundary layers. Cloud-topped boundary layers. Remote sensing. Boundary layer modeling and parameterization. Prerequisite: ATM S 505, AMATH 505, or OCEAN 511. Offered: alternate years; Sp.

ATM S 551 Atmospheric Structure and Analysis I: Synoptic Scale Systems (4) Extratropical cyclones and cyclogenesis. Jet streams. Upper waves in the westerlies. Diagnosis of vertical motions. Fronts and frontogenesis. Prerequisite: ATM S 502 and ATM S 509/OCEAN 512. Offered: alternate years; A.

ATM S 552 Objective Analysis (3) Review of objective analysis techniques commonly applied to atmospheric problems; examples from the meteorological literature and class projects. Superposed epoch analysis, cross-spectrum analysis, filtering, eigenvector analysis, optimum interpolation techniques. Offered: W.

ATM S 555 Planetary Atmospheres (3) Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all; roles of radiation, chemistry, and dynamical processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar system objects in the context of comparative planetology. Offered: jointly with ASTR 555/ESS 581; alternate years.

ATM S 556 Planetary-Scale Dynamics (3) Zonally symmetric circulations, planetary waves, equatorial waves, dynamics of the middle atmosphere, trace constituent transport, nonlinear aspects of atmospheric flows. Prerequisite: ATM S 542 or permission of instructor. Offered: alternate years; Sp.

ATM S 558 Atmospheric Chemistry (3) Photochemistry of urban, rural, and marine tropospheric air, and of the natural and perturbed ozone in the middle atmosphere. Unity of the chemistries in these apparently different regimes. Prerequisite: ATM S 458 or ATM S 501 or CHEM 457 or permission of instructor. Offered: Sp.

ATM S 560 Atmosphere/Ocean Interactions (3) Observations and theory of phenomena of the coupled atmosphere-ocean system. El Nino/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512. Offered: jointly with OCEAN 560; alternate years; Sp.

ATM S 564 Atmospheric Aerosol and Multiphase Atmospheric Chemistry (3) Physics and chemistry of particles and droplets in the atmosphere. Statistics of size distributions, mechanics, optics, and physical chemistry of atmospheric aerosols. Brownian motion, sedimentation, impaction, condensation, and

hyroscopic growth. Prerequisite: permission of instructor. Offered: alternate years; W.

ATM S 571 Advanced Physical Climatology (3) Physical processes that determine the climate of Earth and its past and future changes. Greenhouse effect. Climate modeling. Radiative and dynamical feedback processes. Orbital parameter theory. Critical analysis of climate change predictions. Prerequisite: permission of instructor. Offered: A.

ATM S 575 Large Scale Dynamics of the Tropical Atmosphere (3) Observations and underlying dynamics of large-scale tropical circulations. Factors that determine regions of large-scale persistent precipitation in the tropics, thermal forcing of atmospheric circulations by these regions, and temporal variability of the forcing and response. Credit/no credit only. Prerequisite: ATM S 509/OCEAN 512, ATM S 542. Offered: alternate years; W.

ATM S 581 Numerical Analysis of Time Dependent Problems (5) Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with AMATH 586/MATH 581; Sp.

ATM S 582 Advanced Numerical Modeling of Geophysical Flows (3) Topics of current interest including: efficient time differencing, semi-implicit and multiple time-step techniques. Semi-lagrangian schemes. Treatment of poorly resolved gradients. Flux-corrected transport. Positive definite advection schemes. Aliasing error and nonlinear instability. Wave permeable boundary conditions. Prerequisite: ATM S 581 and AMATH 586 or MATH 586. Offered: alternate years.

ATM S 585 Climate Impacts on the Pacific Northwest (4) *Mantua, Snover* Knowledge of past/future patterns of climate to improve Pacific Northwest resource management. Topics include the predictability of natural/human-caused climate changes; past societal reactions to climate impacts on water, fish, forest, and coastal resources; how climate and public policies interact to affect ecosystems and society. Offered: jointly with ESS/ENVIR/SMA 585; Sp.

ATM S 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ESS 586/OCEAN 586.

ATM S 587 Climate Dynamics (3) *Hartman, Thompson* Examines Earth's climate system; distribution of temperature, precipitation, wind ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly with ESS 587/OCEAN 587; A.

ATM S 588 The Global Carbon Cycle and Climate (3) *Quay* Oceanic and terrestrial biogeochemical processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and

terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with OCEAN 588/ESS 588; W.

ATM S 589 Paleoclimatology: Data, Modeling and Theory (3) *Battisti, Emerson, Steig* Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ESS 589/OCEAN 589; Sp.

ATM S 591 Special Topics (1-4, max. 9) Lecture series on topics of major importance in the atmospheric sciences. Prerequisite: permission of instructor.

ATM S 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

ATM S 700 Master's Thesis (*) Offered: AWSpS.

ATM S 800 Doctoral Dissertation (*) Offered: AWSpS.

Biology

BIOL 100 Introductory Biology (5) NW Develops an awareness of science by studying basic biological principles and their application to problems of humans and society in the contexts of special topics or themes, which vary quarter to quarter. For non-science majors only. Offered: AW.

BIOL 104 Biology for Elementary School Teachers (5) NW *Buttemer* Basic concepts of biology, with emphasis on background needed for confident use of the new science curriculum materials in the elementary school. Offered: AW.

BIOL 106 Introductory Biology Seminar (1/3, max 6) NW Focuses on current topics in biology. Topics vary from quarter to quarter. Designed to enhance learning skills of students who intend to take BIOL 161-162 or BIOL 180/200/220 and major in one of the biological sciences. Recommended: high school chemistry and biology, or one quarter of college chemistry.

BIOL 108 Evolution and Human Behavior (3) NW Introduction to evolution by natural selection, examining the light it can throw on human biology and behavior in such areas as the nature of sex differences, sexual conflict, and conflict between parents and children. Does not fulfill major requirements. Offered: jointly with BIO A 100.

BIOL 110 Elementary Biology for Health Professions I (2) NW *Russell* Elementary biomedical concepts. For Equal Opportunity Program students only. Credit/no credit only. Offered: A.

BIOL 111 Elementary Biology for Health Professions II (2) NW *Russell* Elementary human anatomy and physiology, including selected areas in laboratory medicine. For Equal Opportunity Program students only. Credit/no credit only. Prerequisite: BIOL 110. Offered: W.

BIOL 112 Elementary Biology for Health Professions III (1-4, max. 4) NW *Russell* Field experience in a health profession. For Equal Opportunity Program students only. Credit/no credit only. Prerequisite: BIOL 111. Offered: Sp.

BIOL 113 Introduction to Biosciences (1-3, max. 6) NW *Dirks* Independent study/topics related to material taken in BIOL 180, BIOL 200, and BIOL 220. Credit/no credit only. Offered: AWSp.

BIOL 114 Astrobiology: Life in the Universe (5) NW, QSR Introduction to the new science of astrobiology, study of the origin and evolution of life on Earth, and the search for microbial and intelligent life elsewhere in the Universe. Designed for non-science, liberal arts majors. Offered: jointly with ASTR/ASTBIO/ESS/OCEAN 115.

BIOL 115 Evolution (2) NW *Herron* Evolutionary biology for nonmajors. Evolutionary history of the earth and various theories of evolution. Offered: irregularly.

BIOL 116 Introductory Plant Biology (5) NW *del Moral, Waaland* Basic concepts in plant biology for nonmajors, with emphasis on plant diversity and how plants grow and reproduce. Modern ideas concerning biotechnology, ecology, agriculture, and conservation and environmental issues discussed. Laboratories include greenhouse studies. Offered: W.

BIOL 117 Plant Identification and Classification (5) NW *Olmstead* Plant classification and diversity of seed plants; field study and laboratory identification of the common plant families and the conspicuous flora of western and central Washington. One full-day weekend field trip (optional). For non-majors. Offered: SpS.

BIOL 118 Survey of Physiology (5) NW Human physiology, for nonmajors and health sciences students. Offered: AWSpS.

BIOL 119 Elementary Physiology Laboratory (1) NW Prerequisite: BIOL 118 which may be taken concurrently. Offered: AWSpS.

BIOL 120 Current Controversies in Biology (2-5, max. 6) NW Explores a current controversial topic in biology, stressing information needed by the general public to make informed personal, political, and ethical decisions relating to this topic.

BIOL 161 General Biology (5-) NW Living systems viewed from the subcellular to the community level, emphasizing the diversity, functioning, and interaction of whole organisms. Topics covered include cell structure and function, energy, genetics, animal physiology and development. Emphasizes the position of humans in the biological world. For nonmajors and majors in biology-related fields who need a thorough two-quarter introduction to biology. Recommended: high school chemistry; high school biology. Offered: A.

BIOL 162 General Biology (-5) NW Living systems viewed from the subcellular to the community level, emphasizing the diversity, functioning, and interaction of whole organisms. Topics covered include plant and animal diversity, plant structure and function, general ecology and evolution. Emphasizes the position of humans in the biological world. For nonmajors and majors in biology-related fields who need a thorough two-quarter introduction to biology. Prerequisite: either BIOL 101 or BIOL 161. Offered: W.

BIOL 200 Introductory Biology (5) NW For students intending to take advanced courses in the biological sciences or enroll in preprofessional programs. Metabolism and

energetics, structure and function of biomolecules, cell structure and function, animal development. Second course in a three-quarter series (BIOL 180, BIOL 200, BIOL 220). Cannot be taken for credit if BIOL 201 has already been taken. Prerequisite: 1.5 in BIOL 180; either CHEM 150, CHEM 152, CHEM 155, CHEM 220, CHEM 223, or CHEM 237. Offered: AWSpS.

BIOL 220 Introductory Biology (5) NW For students intending to take advanced courses in the biological sciences or enroll in preprofessional programs. Animal physiology, plant development and physiology. Final course in a three-quarter series (BIOL 180, BIOL 200, BIOL 220). Cannot be taken for credit if BIOL 202 has already been taken. Prerequisite: 1.5 in BIOL 200; either CHEM 150, CHEM 152, CHEM 155, CHEM 220, CHEM 223, or CHEM 237. Offered: AWSpS.

BIOL 222 Natural History of Puget Sound Country (3) NW Explores the greater Puget Sound Basin's diverse physical and biological features. Emphasis on the ecology of the region and its relation to the First Peoples and European late arrivals. Emphasis on the issues of environmental preservation and custodianship of the natural amenities. Optional field trips. For non-majors. Offered: S.

BIOL 223 Diversity in Animals (5) NW Morphological, functional, and ecological diversity within the major phyla of animals. Students who taken ZOO/BIOL 330, ZOO/BIOL 362, ZOO/BIOL 430, ZOO/BIOL 433, ZOO/BIOL 434, or ZOO/BIOL 453 are strongly discouraged from taking this course, due to substantial overlap of material. Recommended: high school biology. Offered: irregularly.

BIOL 226 Laboratory in Environmental Problems (5) NW Processes and structure of ecosystems and conflicting uses made of these environments. For non-science majors. Role and application of science. Field trips to natural and human-modified ecosystems; weekend field trips required. Offered: S.

BIOL 250 Marine Biology (3/5, max. 5) I&S, NW Lecture-laboratory course in Marine Biology focusing on physical, biological, and social aspects of the marine environment. Topics include oceanography, ecology, physiology, behavior, conservation, fisheries, exploration, and activism. Evening marine biology movies and weekend field trip. Honors section research project. Offered: jointly with FISH/OCEAN 250.

BIOL 293 Study Abroad — Biology (1-10, max. 10) NW For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit does not apply to major requirements without approval.

BIOL 311 Biology of Fishes (3/5) NW Lecture and laboratory, of the morphological, physiological, behavioral, and ecological diversity of fishes of the world; designed to provide a basic foundation for advanced courses in all areas of finfish fisheries. 3-credit option does not include laboratory. Recommended: 10 credits biological science. Offered: jointly with FISH 311; W.

BIOL 317 Plant Classification and Identification (5) NW *Olmstead* Classification and diversity of seed plants; concepts and principles of classification, lab and field study of common plant families in Washington, and skill development for identification of species. Cannot be taken for credit if BIOL 117 or BOTANY 113

taken. One weekend field trip. Offered: concurrently with BIOL 117; SpS.

BIOL 320 Game Theory, Evolution, and Behavior (4) I&S, QSR *Bergstrom, Smith* Introduction to the logic and basic techniques of modern game theory, and exemplary applications to understand behavioral variation and social interaction in humans and other species. Emphasizes non-mathematical representations of fundamental concepts and processes, with considerable use of computer-based exercises and experiments. Offered: jointly with ANTH 320.

BIOL 325 Plant Physiology and Development (3) NW Nutrition, assimilation, transport, growth, photosynthesis, cellular respiration, and development in plants. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220. Offered: W.

BIOL 326 Plant Physiology Laboratory (3) NW Laboratory experiments on the growth, nutrition, and metabolism of plants. Prerequisite: BIOL 325, which may be taken concurrently. Offered: Sp.

BIOL 330 Natural History of Marine Invertebrates (5) NW Field and laboratory course emphasizing the habits, habitats, adaptations, and interrelationships of marine animals. Weekend field trips required. Offered: S.

BIOL 331 Landscape Plant Recognition (3) NW Field recognition of important groups of woody landscape plants, emphasizing diversity at the genus and family levels. Cultivated plant nomenclature. Plant descriptive characters evident in the field with eye and hand lens. Hardiness and landscape applications. Recommended: either BIOL 117 or BOTANY 113. Offered: jointly with ESRM 331; SpS.

BIOL 333 Plant Communities: Resilience and Restoration (5) NW Ecological impacts by humans on native plant communities. Effects of grazing, timber removal, habitat draining and filling, fire control, application of chemicals. Potential for ecological restoration of plant communities. Three required weekend field trips. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203; either BIOL 117, BIOL 317, or BOTANY 113. Offered: jointly with ESC 333; irregularly.

BIOL 340 Genetics and Molecular Ecology (5) NW Application of molecular markers to ecology, evolution, and the management of living resources. Emphasis on understanding the strengths and weaknesses of the approach based on case studies. Offered: jointly with FISH 340. Prerequisite: either BIOL 102 or BIOL 200.

BIOL 350 Foundations in Physiology (3) NW Physiology core course for biological sciences majors. Analysis of basic principles of animal and plant physiology, with emphasis on cellular processes that mediate organismic processes. Serves as gateway to upper-division courses in physiology. Prerequisite: either BIOL 202 or BIOL 220; recommended: either PHYS 115 or PHYS 122. Offered: AWSpS.

BIOL 354 Foundations in Evolution and Systematics (3) NW Evolution and systematics core course for biological sciences majors. Emphasizes patterns, processes, and consequences of evolutionary change. Serves as gateway to 400-level courses and seminars in evolution, population genetics, sociobiology, conservation biology, phylogenetics, and

systematics. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: WSpS.

BIOL 355 Foundations in Molecular Cell Biology (3) NW Cell biology core course for biological sciences majors. Emphasis on molecular approaches to understand cell structure, function, and regulation, and the analysis of experimental design and data interpretation. Serves as a prerequisite to advanced 400-level cell, molecular, and developmental biology courses and seminars. Prerequisite: either BIOL 200 or BIOL 201. Offered: AWSpS.

BIOL 356 Foundations in Ecology (3) NW Ecology core course for biological sciences majors. Emphasizes understanding species interactions in biological communities and relationships of communities to environment. Serves as a prerequisite to 400-level courses and senior seminars in ecology, population and conservation biology. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: AWSpS.

BIOL 390 Undergraduate Internship Seminar (1) NW *Crowe* Weekly workshop to prepare students for off-campus research internships. Required for students planning to take BIOL 399. Prerequisite: BIOL 220. Offered: AWSpS.

BIOL 397 Preparing Avian Research Specimens (5) NW Preservation of avian study skins, skeletal specimens, extended wings, and tissues for genetic analyses. Standards required for deposit of specimens in research collections. Examines needs for continued collecting, uses of specimens in discovering new knowledge, and impacts of collecting on wild populations. Prepares students for participation in expeditions. Offered: A.

BIOL 399 Biology Internship Program (3-5, max. 15) NW *Crowe* Coordinated internship in a biology-related field. Registration restricted to students already matched with an internship opportunity in BIOL 390 or by instructor approval. Students must complete at least a combined 10 credits in BIOL 399 over consecutive quarters. Credit/no credit only. Prerequisite: BIOL 390. Offered: AWSpS.

BIOL 401 Advanced Cell Biology (3) NW *Bakken, Crowe, Hille, Wakimoto* Selected topics in molecular cell biology. Strong emphasis on reading and interpreting primary research literature. Writing intensive course. Prerequisite: BIOL 355.

BIOL 402 Cell Biology Laboratory (3) NW Investigative projects using modern molecular methods (restriction enzyme digestion, blotting, hybridization, immunochemistry, density gradient centrifugation, electrophoresis) and other methods currently used to study plant and animal cells, nucleic acids, and proteins. Includes practice in scientific style writing. Prerequisite: BIOL 401, which may be taken concurrently. Offered: ASp.

BIOL 403 Comparative Vertebrate Histology (5) NW Microscopic and submicroscopic anatomy of vertebrates. Emphasis on mammals. Light microscopy and interpretation of ultrastructure. Functions of basic tissue types and organs as related to structure. Prerequisite: BIOL 220. Offered: irregularly.

BIOL 405 Cellular and Molecular Biology of Human Disease (3) NW Concepts of cellular and

molecular biology as applied to human disease. Emphasis on current experimental approaches to investigate disease mechanisms and the contributions of model systems. Selected topics in cancer biology, viral induced disease, gene therapy. Prerequisite: either BIOL 202 or BIOL 220; either BIOC 405, BIOC 440, BIOL 355, BIOL 401, GENET 371, or GENET 372. Offered: A.

BIOL 406 Insect Behavior (4) NW *O'Donnell* Explores complexity and diversity of behavior in insects and related invertebrate animals. Overview of important lineages of insects and major behavioral traits. Examines how insect biology both constrains behavior and provides evolutionary opportunities. Prerequisite: either 2.0 in BIOL 180, 3.5 in PSYCH 200, or 2.0 in PSYCH 300. Offered: jointly with PSYCH 406.

BIOL 407 Plant Nuclear and Cytoplasmic Genetics (3) NW *Bendich, Comai* Covers genetic aspects specific to plants and algae, including chromosome structure, genome mapping, transposon biology, genes for floral and vegetative development, genetic engineering, ploidy levels, and cytoplasmic genetics. Prerequisite: either BIOL 101, BIOL 200, or BIOL 203; either GENET 371, GENOME 371, GENET 372, or GENOME 372.

BIOL 408 Mechanisms of Animal Behavior (4) NW *Beecher, Brenowitz* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either 2.0 in BIOL 180, or 3.5 in PSYCH 200, or 2.0 in PSYCH 300. Offered: jointly with PSYCH 408.

BIOL 409 Sociobiology (5) NW Biological bases of social behavior, emphasizing evolution as a paradigm. Emphasizes how to think like evolutionary biologist, especially with regard to interest conflict. Topics are individual versus group selection, kin selection, altruism, mating systems, sexual conflict, alternate reproductive strategies, and parent/offspring conflict. Prerequisite: either 3.5 in PSYCH 200, 2.0 in PSYCH 300, 2.0 in BIOL 162, or 2.0 in BIOL 180. Offered: jointly with PSYCH 409.

BIOL 410 Circadian Rhythms and Clocks (5) NW A laboratory-based course where students choose one organism (rodent, *Drosophila* or plants) on which they carry out a research project throughout the quarter. Lectures cover the basic theoretical background and discussion seminars are based on journal articles directly related to the students' research projects. Prerequisite: BIOL 350 or BIOL 355. Offered: A.

BIOL 411 Developmental Biology (4) NW *Schubiger, Swalla* Embryology and subsequent development of vertebrate and invertebrate animals, including *Xenopus*, mammals, chicks, *Drosophila*, echinoderms. Morphological changes in developing animals; experimental analysis of developing systems; underlying genetic and biochemical regulation of development. Prerequisite: either BIOL 355 or BIOL 401. Offered: AW.

BIOL412 Developmental Biology Laboratory (3) NW Normal development of living embryos (frog, chick, insect, echinoderm). Internal anatomy of embryos on prepared slides. Comparisons between vertebrate and inverte-

brate animals. Scientific style reports on experiments. Prerequisite: BIOL 411, which may be taken concurrently. Offered: irregularly.

BIOL 413 Methods and Problems in Development (3) NW *Schubiger* Special topics in development. Integrating classical and current approaches. Developmental genetics, experimental embryology, molecular mechanisms of developmental regulation, and gene function in cell determination and cell differentiation in animal systems. Prerequisite: BIOL 411. Offered: irregularly.

BIOL 414 Molecular Evolution (5) NW *S. Edwards* Survey of empirical approaches to the study of molecular evolution and ecology, drawing on examples from a variety of taxa and the recent literature. Topics include DNA sequencing and systematics, fingerprinting approaches in behavioral ecology, and adaptive evolution at the molecular level. Prerequisite: BIOL 354. Offered: jointly with GENOME 414.

BIOL 415 Evolution and Development (3) NW *Swalla* Analysis of intertwined developmental and evolutionary processes studied through evolution of developmental genes, proteins, and expression patterns in different organisms. Includes reading and analyzing implications for ecology evolution, and human disease. Prerequisite: either BIOL 354 or BIOL 355. Offered: irregularly.

BIOL 416 Molecular Genetics of Plant Development (3) NW *Comai, Torii* Plant growth and development examined in molecular-genetic terms. Covers mutation, dominance, redundancy, epistasis, and key technologies for discovery of gene function as well as embryogenesis, meristem formation, flower development, and other problems in plant development. Prerequisite: BIOL 220, GENOME 371.

BIOL 425 Advanced Plant Physiology and Development (3) NW Expanded coverage of plant growth, nutrition, metabolism, and development. Cannot be taken for credit if BIOL 325 already taken. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220. Offered: concurrent with BIOL 325; W.

BIOL 426 Advanced Plant Physiology Laboratory (3) NW Expanded laboratory experiments on the growth, nutrition, metabolism, and development of plants. Cannot be taken for credit if BIOL 326 already taken. Prerequisite: BIOL 325 or BIOL 425, which may be taken concurrently. Offered: concurrent with BIOL 326.; Sp.

BIOL 427 Biomechanics (4) NW *Daniel* Physical biology emphasizing a mechanical approach to ecological, evolutionary, and physiological questions. Basic principles underlying fluid and solid mechanics to explore responses of animals to flows, loads, and motions. Recommended: either BIOL 102, BIOL 162, BIOL 202, or BIOL 220; either MATH 125 or Q SCI 292; either PHYS 114 or PHYS 121. Offered: W, even years.

BIOL 428 Techniques for Mathematical Biology (3) NW Equips students to use, rather than prove, many applied mathematics techniques essential in mathematical biology. Includes instruction to use symbolic computation software (Mathematica, Macsyma) to do by computer the kind of mathematical formula manipulation that mathematicians formerly performed by hand. Recommended: calculus, linear algebra. Offered: irregularly.

BIOL 430 Marine Zoology (8) NW *Strathmann* Survey of groups of invertebrate animals represented in the San Juan Archipelago; natural history, functional morphology, ecology, distribution, habitat, adaptation, trophic interrelationships, and evolution. Permission of Director, Friday Harbor Laboratories required for registration. Recommended: 20 credits in biological sciences; corequisite: BIOL 445. Offered: at Friday Harbor Laboratories; Sp.

BIOL 432 Marine Invertebrate Zoology (9) NW Comparative morphology and biology of marine invertebrates with emphasis on field and laboratory studies. Representatives of all major and most minor phyla are collected, observed alive, and studied in detail. Not open for credit to students who have taken 433 or 434. Recommended: 20 credits in biological sciences. Offered: at Friday Harbor Laboratories; S.

BIOL 433 Marine Ecology (5) NW *Ruesink* Study of marine ecological processes such as recruitment, disturbance, competition, and predation, and their effects on the structure and diversity of marine communities. Weekend field trips to local intertidal habitats required. Prerequisite: either BIOL 356, BIOL 472, or a minimum grade of 3.4 in BIOL 180. Offered: Sp, odd years.

BIOL 434 Invertebrate Zoology (5) NW Comparative biology and morphology of invertebrates. Laboratory work emphasizes structures and functions. Emphasizes annelids and related worms, mollusks, and arthropods. Not open to students who have taken 430 or 432. Prerequisite: either BIOL 102, BIOL 202, or BIOL 220. Offered: irregularly.

BIOL 435 Biology of Eukaryotic Microbes (5) NW Introduction to comparative biology of eukaryotic microbes known as protists (algae, certain fungi, and protozoa). Emphasis on the structure, reproductive characteristics, classification, phylogeny, physiology, development, biodiversity, and ecological roles of these microbes. Emphasis on examples most commonly used in contemporary biological research. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: irregularly.

BIOL 436 Advanced Systematics (5) NW Analysis of characters and examination of evolutionary principles as they relate to systematic studies in vascular plants. Offered: irregularly. Prerequisite: BIOL 354.

BIOL 437 Origins of Our Modern Floras (5) NW Evolution and biogeographic development of modern forest taxa and associations. Late Cenozoic forests (last 60 million years) of western North American environments, emphasizing geologic and climatic shifts that have shaped temperate and tropical vegetation. Three required weekend field trips. Prerequisite: either BIOL 117, BIOL 317, or BOTANY 113 and either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: irregularly.

BIOL 438 Biological Monitoring and Assessment (5) NW *Karr* Explores the technical questions (conceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools — existing and needed — to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with FISH 438.

BIOL 440 General Mycology (5) NW *Ammirati* General survey of the fungi with emphasis on life

cycles, structure, physiology, economic importance. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: W.

BIOL 441 Morphology and Anatomy of Land Plants (5) NW Comparative morphology and anatomy of land plants. Derivation of morphological structures and basis for current classification schemes examined using living and fossil organisms. Laboratories emphasize live plants native to the Pacific Northwest. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220; recommended BIOL 317. Offered: A.

BIOL 442 Mushrooms and Related Fungi (5) NW *Ammirati* General biology, ecology, and classification of mushrooms, polypores, puffballs, and other related basidiomycetes. Emphasis on Pacific Northwest species. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220; recommended BIOL 440. Offered: S.

BIOL 443 Natural History of Mammals (5) NW *Kenagy* Field, lecture, and laboratory course introducing mammals in a general biological context, emphasizing ecology, evolution, behavior, morphology, and adaptation to the environment. Includes required weekend field trips, for which students may be required to share a portion of transportation costs. Prerequisite: either BIOL 354 or BIOL 356. Offered: A.

BIOL 444 Natural History of Birds (5) NW *Wingfield* Field, lecture, and laboratory study of birds framed in biological theory rather than taxonomy. Breeding systems, brood parasitism, appearance, molt, migration, orientation, social behavior, song, and flight are emphasized. Includes Saturday and weekend field trips for which students are required to share a portion of transportation costs. Prerequisite: BIOL 220; recommend BIOL 350 or BIOL 356. Offered: irregularly.

BIOL 445 Marine Botany (8) NW Survey of plants represented in marine environments; natural history; ecology, distribution, habitat, adaptation, and trophic interrelationships. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220; BIOL 430/ZOOL 430, which may be taken concurrently. Offered: at Friday Harbor Laboratories; Sp.

BIOL 446 Biology of Algae (5) NW *Cattolico, Waaland* Study of major algal groups emphasizing form, function, reproduction, distribution, biodiversity, and ecological roles in coastal, oceanic, and global ecosystems. Topics include classification, cellular and organismal features, phylogeny, and evolution of major algal groups. Emphasizes economically useful and ecologically important algae. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: Sp.

BIOL 448 Marine Algal Ecology (3) NW *Waaland* Marine environment in relation to requirements for algal life. Intertidal, subtidal, geographical, and seasonal distribution of marine algae. Functional aspects of algal form, structure, productivity, and energy economy of marine algal communities. Algal utilization and aquaculture. Offered: on demand.

BIOL 451 Invertebrate Paleontology (5) NW *Ward* Important larger invertebrate groups; morphology, classification, stratigraphic distribution, evolution, paleoecology. Offered: jointly with ESS 451; W.

BIOL 452 Vertebrate Biology (5) NW The biology of vertebrate animals, emphasizing their diversity, adaptations, and evolutionary history. Introduces aspects of behavior, physiology, morphology, and ecology that emerge from the comparative study of vertebrates. Laboratory includes local field trips, films, and introduction to regional vertebrate fauna. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or both BIOL 202 and BIOL 203. Offered: S.

BIOL 453 Comparative Anatomy of Vertebrates (5) NW Comparison of the structure of vertebrate organ systems: integument, skeletal, muscle, digestive, respiratory, cardiovascular, urinary, and reproductive, with an emphasis on evolutionary trends. Prerequisite: BIOL 350. Offered: W.

BIOL 454 Entomology (3) NW Biology of terrestrial arthropods, with emphasis on insects. Structure, classification, physiology, and ecology of insects. Interrelationships of insects and man. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or both BIOL 202 and BIOL 203. Offered: W.

BIOL 455 Entomology Laboratory (2) NW Structure and function of arthropods, with emphasis on insects. Field studies and taxonomy of important insect groups. Students may be required to share a portion of the transportation costs of field trips. Prerequisite: BIOL 454 which may be taken concurrently. Offered: Sp.

BIOL 456 Vegetation of Western Washington (5) NW *del Moral* Vegetation of western Washington, including mature, seral, and weedy vegetation. Recognition of landscape patterns, sight identification of common and indicator species, classification of major community types, and uses of native species in landscape design. Four weekend field trips required. Prerequisite: either BIOL 117 or BIOL 317. Offered: even years; Sp.

BIOL 459 Developmental Neurobiology (3) NW *Bosma* Invertebrate and vertebrate examples illustrate the mechanisms used in constructing nervous systems. Focus on the cellular and molecular mechanisms that underlie questions about the basis of neuronal diversity, axonal pathfinding and target recognition, synaptogenesis, and activity-dependent plasticity. Prerequisite: either BIOL 350 or BIOL 355. Offered: W, even years.

BIOL 460 Mammalian Physiology (3) NW Principles of mammalian physiology with special emphasis on the cardiac, respiratory, renal systems taught at the organ and organ systems level. Prerequisite: BIOL 350. Offered: Sp.

BIOL 461 Neurobiology (3) NW *Bosma, Perkel* Broad examination of integrative mechanisms in central nervous system function, with emphasis on sensory processing, plasticity, and control of behavior. Examples are taken from a variety of animal groups. Prerequisite: BIOL 350; either PHYS 115 or PHYS 122. Offered: W, even years.

BIOL 462 Advanced Animal Physiology (3) NW *Huey, Wenderoth* Physiology at levels of organisms and behavior, organ systems, and cells — an evolutionary and integrative perspective. Organismal physiology: metabolism, temperature, locomotion, osmoregulation, respiration, circulation, digestion. Prerequisite: either BIOL 202 or BIOL 220; either BIOL 350 or BIOL 460; either CHEM 152, CHEM 155, CHEM 160, CHEM 162, CHEM 164, CHEM 165, or CHEM 220; either PHYS 114 or PHYS 121. Offered: A.

BIOL 463 Advanced Animal Physiology Lab (3) NW Huey, Wenderoth Experimental design and techniques, data analysis, written reports. Original project labs and experiments in physiology. Prerequisite: BIOL 462, which may be taken concurrently. Offered: A.

BIOL 464 Invertebrate Endocrinology (3) NW Survey of endocrine mechanisms used by invertebrate groups to regulate homeostasis, growth, reproduction, and behavior. Special emphasis given to invertebrate model systems that provide unique insights into basic biological processes. Prerequisite: either BIOL 350 or BIOL 355; recommended BIOL 405 or BIOL 411. Offered: Sp, even years.

BIOL 465 Comparative Endocrinology (3) NW Wingfield Hormonal integration of living processes at all levels in animals: molecules, cells, organs, organisms, populations. Prerequisite: BIOL 350. Offered: A.

BIOL 466 Comparative Endocrinology Laboratory (2) NW Wingfield A broad introduction to endocrine techniques with appropriate experiments to accompany and enlarge on material presented in BIOL 465. Prerequisite: BIOL 465, which may be taken concurrently. Offered: A.

BIOL 467 Comparative Animal Reproduction (3) NW Ramenofsky, Wingfield Reproductive mechanisms, environmental influences on reproductive endocrinology, physiology, behavior, ecology of vertebrates. Discussions extend from organismal to cellular level, and focus on diversity of reproductive patterns among vertebrates. Prerequisite: BIOL 350; recommended: BIOL 465. Offered: Sp.

BIOL 468 Comparative Animal Reproduction Laboratory (3) NW Ramenofsky, Wingfield Laboratory and field studies on animal reproduction involving endocrinology, anatomy, behavior, and ecology. Accompanies, supplements, and extends material presented in 467. Prerequisite: BIOL 467, which may be taken concurrently. Offered: Sp.

BIOL 469 Experiments in Animal Physiology (2) NW Riddiford, Truman Experimental design and techniques, data analysis, written reports. Experiments in integrative physiology. Prerequisite: BIOL 350; either PHYS 115 or PHYS 122. Offered: irregularly.

BIOL 470 Biogeography (4) NW Analysis of historical and ecological determinants of current and past distributions of organisms. Integrates techniques developed by taxonomists, paleontologists, geologists, evolutionists, ecologists, and biogeographers to elucidate relationships between geographical distributions and continental drift, geological interactions, climate, and dispersal abilities of organisms. Not available for credit if credit has previously been given for ZOOL 475. Recommended: one year college biology; background in ecology and evolution. Offered: irregularly.

BIOL 471 Plant Ecology (5) NW Basic concepts of plant ecology, including studies of the environment, plant-environment interactions, populations, communities, and ecosystems. Laboratory includes one weekend field trip, laboratory and greenhouse experiments, and an introduction to ecological problem solving. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: irregularly.

BIOL 472 Community Ecology (4) NW Explores the complexity of biological communities and interactions of plant, animal, and microbes in marine, freshwater, and terrestrial ecosystems. Promotes synthetic and integrative thinking in the environmental sciences through the study of theoretical and empirical issues and original research data. Prerequisite: BIOL 356; recommended: solid foundation in math and physics. Offered: irregularly.

BIOL 473 Limnology (3) NW Schindler Ecology, conservation and management of inland aquatic ecosystems. Explores interactions among biological, chemical and physical features of lakes and other aquatic habitats. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: jointly with FISH 473; A.

BIOL 474 Limnology Laboratory (2) NW Schindler Examination of biota of fresh waters, survey of limnological methods, analysis of data, and writing of scientific papers. Prerequisite: BIOL 473, which may be taken concurrently. Offered: jointly with FISH 474; A.

BIOL 475 Animal Migration (3) NW Undergraduate seminar on evolution, ecology, behavior, and physiology of migration. Student presents a seminar and leads class discussion on a selected topic. Prerequisite: either BIOL 102, BIOL 162, BIOL 203, or BIOL 220; recommended: course in physiology, ecology, or animal behavior.

BIOL 476 Conservation Biology (5) NW Boersma Explores biological, managerial, economic, and ethical concepts affecting survival of species. Applications of ecology, biogeography, population genetics, and social sciences for the preservation of species in the face of widespread global habitat modification, destruction, and other human activities. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: AS.

BIOL 477 Marine Conservation (3) NW Terrestrially based concepts of conservation biology applied to marine systems. Human activities affecting the marine environment including fishing and pollution; influence of legal and cultural frameworks; and ecosystem management. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: irregularly.

BIOL 478 Topics in Sustainable Fisheries (3, max. 9) I&S/NW Parrish Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with ENVIR/FISH 478; odd years; W.

BIOL 479 Alpine Plant Ecology (5) NW Structure of plant communities in alpine regions of the Pacific Northwest. Characteristics of physical environment which influence species adaptation and distribution. Influence, impact of humans and criteria for preservation and/or management of alpine areas. Three weekend field trips required. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, or BIOL 203. Offered: irregularly.

BIOL 480 Field Ecology (4) NW Boersma Field projects examining ecological and behavioral topics such as foraging and social behavior, species interactions, and structure of terrestrial and aquatic communities. Two weekend fieldtrips required. Prerequisite: either BIOL 356 or BIOL 472. Offered: Sp.

BIOL 482 Microscopy and Photography for Biologists (3) NW Waaland Principles and practice of light microscopy, photomicrography, and scientific photography. Illumination systems, bright field, phase-contrast, dark field, fluorescence and other microscopical techniques. Photographic and video image recording of microscopic and macroscopic scientific specimens. Offered: irregularly.

BIOL 484 Senior Seminar in Evolution and Systematics (1-3, max. 9) NW Supervised readings and group discussion. Prerequisite: BIOL 354.

BIOL 485 Senior Seminar in Cellular, Molecular and Developmental Biology (1-3, max. 9) NW Supervised readings and group discussion. Prerequisite: BIOL 355.

BIOL 486 Senior Seminar in Ecology (1-3, max. 9) NW Supervised readings and group discussion. Prerequisite: BIOL 356.

BIOL 487 Senior Seminar in Conservation Biology (1-3, max. 9) NW Supervised readings and group discussion. Recommended: one upper division course in ecology or conservation biology.

BIOL 488 Senior Seminar in Physiology (1-3, max. 9) NW Supervised readings and group discussion. Prerequisite: BIOL 350.

BIOL 489 Senior Seminar in Plant Biology (1-3, max. 9) NW Supervised readings and group discussion. Recommended: one upper division course emphasizing plant biology.

BIOL 490 Undergraduate Seminar (1-3, max. 6) NW Supervised readings and group discussion of selected topics of broad biological significance. Prerequisite: BIOL 102, BIOL 162, BIOL 203, or BIOL 220.

BIOL 491 Special Topics in Biological Science for Teachers (1-9, max. 9) NW Study of selected areas of biology. Designed to enhance the skills and background of K-12 teachers. Credit/no credit only. Recommended: teaching experience.

BIOL 492 The Teaching of Biology (2) Basic course in the teaching of biology in the secondary school. Designed to help preservice teachers identify useful laboratory techniques, materials, and content for the teaching of pre-college biology. Special attention to current issues in biology education. Required for biology students in Teacher Certification Program.

BIOL 493 Study Abroad — Advanced Biology (1-15, max. 15) NW For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit does not apply to major requirements without approval.

BIOL 496 Peer Teaching Assistants in Biology (1-5, max. 10) Direct experience in the classroom, typically teaching a lab section of BIOL 100. Peer Teaching Assistants attend lectures and weekly preparation meetings and gain in-depth background on the subject material as well as training in teaching techniques and

approaches. Credit/no credit only. Prerequisite: either BIOL 102, BIOL 162, BIOL 220, or both BIOL 202 and BIOL 203. Offered: AWSp.

BIOL 497 Special Topics in Biology (1-5, max. 10) NW .

BIOL 498 Library Research (1-5, max. 10) .

BIOL 499 Undergraduate Research (1-20, max. 20) .

BIOL 500 Topics in Biology (1-3, max. 16) . Offered: Sp.

BIOL 505 Problems in Biological Instruction (1-3, max. 3) .

BIOL 510 Seminar in Mathematical Biology (1-3, max. 15) *Bergstrom, Daniel, Grunbaum, Kot, Odell, Thompson* Seminar on a topic of current interest in mathematical biology. Graduate status required, or permission of instructor for undergraduates.

BIOL 511 Topics in Mathematical Biology (1-3, max. 15) Discussion of current topics in mathematical biology. Graduate status required, or permission of instructor for undergraduates.

BIOL 520 Departmental Seminar (1, max. 18) Credit/no credit only. Offered: AWSp.

BIOL 533 Advanced Invertebrate Zoology (9) Invertebrate fauna of the San Juan Archipelago. Topic changes from year to year. Individual research projects are emphasized. Prerequisite: course in invertebrate zoology and permission of Director of Friday Harbor Laboratories. Offered: at Friday Harbor Laboratories; SpS.

BIOL 536 Comparative Invertebrate Embryology (9) Diversity in developmental patterns in major marine taxa. Analysis of evolutionary changes in development. Emphasis on observation of live embryos and larvae. Prerequisite: permission of Director of Friday Harbor Laboratories; recommended: courses in invertebrate zoology and developmental biology. Offered: at Friday Harbor Laboratories; SpS.

BIOL 538 Advanced Invertebrate Physiology (9) General and comparative aspects of nerve and muscle physiology with particular emphasis upon neuronal control of behavior, neuronal interactions, and other advanced topics determined by visiting faculty. Extensive laboratory experience, including intracellular and extracellular stimulating and recording techniques. Offered: at Friday Harbor Laboratories; Sp.

BIOL 539 Marine Phycology (9).

BIOL 540 Seminar in Molecular, Cellular, and Developmental Biology (1-3, max. 15) Weekly discussions of past and current scientific literature in cell, molecular, and/or developmental biology, review of the state of the field, and presentation of research results. Discussions may cover the full breadth of the discipline or focus on selected topics. Graduate status required, or permission of instructor for undergraduates.

BIOL 541 Topics in Molecular, Cellular, and Developmental Biology (1-3, max. 15) Focused discussion of on-going cell, molecular, or developmental biology research occurring in the instructor's laboratory. Graduate status required, or permission of instructor for undergraduates.

BIOL 542 Analysis of Development (1-3, max. 15) Analysis of structural, physiological, and molecular levels of developmental processes, including gametogenesis, fertilization, cell and tissue movements, induction, and cytodifferentiation. Graduate standing or permission of instructor.

BIOL 543 Biology of Drosophila Seminar (1, max. 12) Weekly presentation by participants of classical literature, current literature, and research in the molecular biology, developmental biology, neurobiology, and genetics of *Drosophila*. Prerequisite: permission of instructor. Offered: AWSp.

BIOL 546 Experimental Design in Cell Biology (1.5) *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest is covered in depth in order to follow a line of investigation and critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with CONJ 536; W.

BIOL 550 Seminar in Evolution and Systematics (1-3, max. 15) Weekly discussions of past and current scientific literature in evolution and/or systematics, reviews of the state of the field, and presentation of research results. Discussions may cover the full breadth of the discipline or focus on selected topics. Graduate status required, or permission of instructor for undergraduates.

BIOL 551 Topics in Evolution and Systematics (1-3, max. 15) Focused discussion of on-going research in evolution and/or systematics occurring in the instructor's laboratory. Graduate status required, or permission of instructor for undergraduates.

BIOL 552 Advanced Evolution (3) Successful analytical approaches to understanding evolutionary patterns and the processes that generate them, examined by using a wide array of empirical and theoretical tools. Survey of how theory, modeling, and statistics can be applied to observations and experiments in evolutionary biology. Graduate standing required.

BIOL 560 Seminar in Ecology (1-3, max. 15) Weekly discussions of past and current scientific literature in ecology, reviews of the state of the field, and presentation of research results. Discussions may cover the full breadth of the discipline or focus on selected topics. Graduate status required, or permission of instructor for undergraduates.

BIOL 561 Topics in Ecology (1-3, max. 15) Focused discussion of on-going research in ecology occurring in the instructor's laboratory. Graduate status required, or permission of instructor for undergraduates.

BIOL 562 Advanced Ecology (3) Successful analytical approaches to understanding ecological patterns and the mechanisms that generate them, examined by using a wide array of empirical and theoretical tools. Applying theory, modeling, and statistics to empirically derived data to providing insight and solutions to key environmental problems. Graduate standing required.

BIOL 570 Seminar in Conservation Biology (1-3, max. 15) Weekly discussions of past and current scientific literature in conservation biology, reviews of the state of the field, and presentation of research results. Discussions

may cover the full breadth of the discipline or focus on selected topics. Graduate status required, or permission of instructor for undergraduates.

BIOL 571 Topics in Conservation Biology (1-3, max. 15) Focused discussion of on-going research in conservation biology occurring in the instructor's laboratory. Graduate status required, or permission on the instructor for undergraduates.

BIOL 572 Science and Environmental Policy (3-5, max. 5) .

BIOL 580 Seminar in Physiology (1-3, max. 15) Weekly discussions of past and current scientific literature in physiology, reviews of the state of the field, and presentation of research results. Discussions may cover the full breadth of the discipline or focus on selected topics. Graduate status required, or permission of instructor for undergraduates.

BIOL 581 Topics in Physiology (1-3, max. 15) Focused discussion of on-going research in physiology occurring in the instructor's laboratory. Graduate status required, or permission of instructor for undergraduates.

BIOL 590 Seminar in Organismal Biology (1-3, max. 15) Weekly discussions of past and current scientific literature in organismal biology, reviews of the state of the field, and presentation of research results. Discussions may cover the full breadth of the discipline or focus on selected topics. Prerequisite: graduate standing, or permission of instructor for undergraduates.

BIOL 591 Topics in Organismal Biology (1-3, max. 15) Focused discussion of on-going research in organismal biology occurring in the instructor's laboratory. Prerequisite: graduate standing, or permission of instructor for undergraduates.

BIOL 600 Independent Study or Research (1-9, max. 9) Credit/no credit only.

BIOL 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

BIOL 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Center for Statistics and Social Sciences

CS&SS 320 Evaluating Social Science Evidence (5) I&S, QSR A critical introduction to the methods used to collect data in social science: surveys, archival research, experiments, and participant observation. Evaluates "facts and findings" by understanding the strengths and weaknesses of the methods that produce them. Case based. Offered: jointly with SOC 320/STAT 320; A.

CS&SS 321 Case-Based Social Statistics I (5) I&S, QSR *Handcock* Introduction to statistical reasoning for social scientists. Built around cases representing in-depth investigations into the nature and content of statistical and social-science principles and practice. Hands-on approach: weekly data-analysis laboratory. Fundamental statistical topics: measurement, exploratory data analysis, probabilistic concepts, distributions, assessment of statistical evidence. Offered: jointly with SOC/STAT 321; W.

CS&SS 481 Introduction to Mathematical Statistics (5) NW Probability, generating functions; the d-method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 136 or MATH 126 with either MATH 308 or MATH 309. Recommended: MATH 324. Offered: jointly with ECON/STAT 481; A.

CS&SS 501 Advanced Political Research Design and Analysis (5) I&S Third methods course in political research. Testing theories with empirical evidence. Examines current topics in research methods and statistical analysis in political science. Content varies according to recent developments in the field and with interests of instructor. Offered: jointly with POL S 501.

CS&SS 503 Advanced Quantitative Political Methodology (5) Quinn, Ward Theory and practice of likelihood inference. Topics covered include probability modeling, maximum likelihood estimation, models for binary responses, count models, sample selection, and basis time series analysis. Prerequisite: POL S 500; POL S 501. Offered: jointly with POL S 503.

CS&SS 504 Applied Regression (4) Least squares estimation. Hypothesis testing. Interpretation of regression coefficients. Categorical independent variables. Interactions. Assumption violations: outliers, residuals, robust regression; nonlinearity, transformations, ACE, CART; nonconstant variance. Variable selection and model averaging. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, STAT/ECON 481, or SOC 425; recommended: MATH 308. Offered: jointly with STAT 504.

CS&SS 505 Review of Mathematics for Social Scientists (1) Reviews basic mathematical skills needed for a meaningful understanding of elementary statistics, data analysis, and social science methodology. Overview of core knowledge required for graduate courses in quantitative methods in social sciences. Topics include discrete mathematics, differential and integral calculus, review of matrix algebra, and basic probabilistic and statistical concepts. Offered: Sp.

CS&SS 506 Computer Environments for the Social Sciences (1) Familiarizes graduate students in the social sciences with modern environments for statistical computing. Provides an overview of available resources and a description of fundamental tools used in quantitative courses and doctoral research. Topics include interfaces to Web-based resources, UNIX-based computing, and major statistical packages (R, SPLUS, SAS, and SPLUS). Offered: W.

CS&SS 507 Methodology: Quantitative Techniques in Sociology (3) I&S Applied regression analysis with emphasis on interactive computer graphics techniques and interpretation. Application to typical sociological problems. Offered: jointly with SOC 506; A.

CS&SS 508 Introduction to R for Social Scientists (1) Hancock Familiarizes students with the R environment for statistical computing (<http://www.r-project.org>). R is a freely available, multi-platform, and powerful program for analysis and graphics similar to S-PLUS. Covers the basics of organizing, managing, and manipulat-

ing social science data; basic applications; introduction to programming; links to other major statistical packages. Offered: A.

CS&SS 526 Structural Equation Models for the Social Sciences (3) Structural equation models for the social sciences, including specification, estimation, and testing. Topics include path analysis, confirmatory factor analysis, linear models with latent variables, MIMIC models, non-recursive models, models for nested data. Emphasizes applications to substantive problems in the social sciences. Prerequisite: SOC 424, SOC 425, SOC 426 or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 529.

CS&SS 527 Survey Research Methods (4) Provides students with skills in questionnaire development and survey methods. Develops a questionnaire and design a survey research proposal on a health-related or social topic. Prerequisite: either HSERV 511-513, BIOSTAT 517-518, EPI 512-513, which may be taken concurrently or permission of the instructor is required, and students should have a survey project in mind. Offered: jointly with HSERV 527.

CS&SS 529 Sample Survey Techniques (3) Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent; or permission of instructor. Offered: jointly with BIOST 529/STAT 529.

CS&SS 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 536/STAT 536.

CS&SS 568 Statistical Analysis of Game-Theoretic Data (5) Quinn Provides students tools to derive appropriate statistical models from game-theoretic models of behavior. Topics include review of non-cooperative game-theory, quantal-response equilibria, analysis of experimental game data, analysis of observational game data, non-parametric and semi-parametric methods. Prerequisite: POL S 494, POL S 559. Offered: W.

CS&SS 569 Visualizing Data (4) Adolph Explores techniques for visualizing social science data to complement graduate training methods. Emphasis on principles and perception of visualization, novel exploration and presentation of data and statistical models, and implementation of recommended techniques in statistics packages. Prerequisite: SOC 504, SOC 505 and SOC 506. Recommended: CS&SS 505 and CS&SS 506.

CS&SS 589 Multivariate Data Analysis for the Social Sciences (3, max. 6) Erosheva Provides social scientists with an introduction to multivariate analysis techniques and the knowledge to carry them out. Focuses on statistical methods that explore relationships

between observed variables. Topics include principal components, cluster, factor, latent class analysis. Prerequisite: SOCWL 587, 588, or equivalent. Offered: jointly with SOC WL 589; A.

CS&SS 590 CSSS Seminar (1, max. 20) Presentations of ongoing social science research involving cutting edge statistical methods. Credit/no credit only. Offered: AWSp.

CS&SS 594 Special Topics in Social Science and Statistics (1-5, max. 30) Topics vary. Prerequisite: permission of instructor. Offered: AWSp.

Center for Studies in Demography and Ecology

CSDE 501 Population Studies Seminar Series (1) CSDE affiliates and visitors present current research projects. Credit/no credit only. Offered: AWSp.

CSDE 502 Population Studies Proseminar (1) Professional training in demography and populations studies. Includes ethics in population research, human subjects review, proposal application and writing. DSDE faculty research specialization, and research preparation and presentation. Credit/no credit only. Offered: ASp.

CSDE 595 Special Topics in Population Studies (3) Examination of current substantive and methodological topics in demography. Content varies according to recent developments in the field and interest of the instructor.

Center for the Humanities

HUM 200 Issues in the Humanities (1-5, max. 15) I&S/VLPA Topics and issues of current interest in the humanities and the study of the arts. Features numerous guest lecturers from the U.W. faculty together with distinguished visiting teachers, scholars, and artists.

HUM 201 Introduction to Studies in the Humanities (5) VLPA Focuses on the interdisciplinary nature of the humanities with an emphasis on writing. Team-taught lectures and discussion sections for freshmen. Offered: A.

HUM 202 Introduction to Themes in the Humanities (5) VLPA/I&S Focuses on the interdisciplinary nature of the humanities with an emphasis on writing. Investigation of forms and methods the humanities employ to explore life's biggest questions. Team-taught lectures and discussion sections for freshmen. Offered: W.

HUM 203 Introduction to Historical and Cultural Contexts in the Humanities (5) VLPA/I&S Focuses on the interdisciplinary nature of the humanities with an emphasis on writing. Historical and cultural contexts of the humanities and emergence of humanistic themes in particular geographies or among specific cultures or groups. Team-taught lectures and discussion sections for freshmen. Offered: Sp.

HUM 205 Religion, Violence, and Peace: Patterns Across Time and Tradition (5) I&S Noegel, Wellman Investigates the complex relationship between violence and peace in a variety of religious traditions. Examines case studies from the ancient Near East, medieval East Asia, and the contemporary West from the standpoint of lived experiences and contemporary theories derived from several academic

disciplines. Offered: jointly with RELIG/NEAR E 205; W.

HUM 210 Texts in Context (5, max. 15) I&S/VLPA Links a single, major work from any medium, or a narrowly bounded group of closely related, smaller works, to the cultural, intellectual, and historical circumstances of its creation and interpretation. Emphasizes close-reading and careful writing.

HUM 220 Themes in Time and Culture (5, max. 15) I&S/VLPA Traces the articulation and development of a single overarching idea in different idioms, cultures and eras. Asks how, and if, notions that are fundamental to one era or culture find expression in other times and places. Emphasizes comparative analysis and careful writing.

HUM 411 Applications of Digital Technologies to Humanities Research (5) VLPA Hands-on project-based approach to imaging, new media, text, databases, metadata and accessibility, rights management, and other issues central to contemporary humanities research. Offered: jointly with DXARTS 411.

HUM 498 Special Topics in the Humanities (1-5, max. 15) I&S/VLPA Examination of selected topics in the humanities and the study of the arts. Taught by U.W. faculty and visiting scholars and artists.

HUM 520 Seminar in Textual Theory (5) Introduction to the theoretical perspectives that have shaped the emerging interdisciplinary field of Textual Studies. Included in curriculum of Textual Studies Program.

HUM 521 Seminar in Scribal Texts (5) Relationship between oral and written texts and of the social and cultural systems which enable their production, transmission, and preservation. Included in curriculum of Textual Studies Program.

HUM 522 Seminar in Printed Texts (5) Study of printing as a means of textual transmission in the ages of the hand press, machine press, and electronic press; of current theories of editing; and of preparing critical editions of printed texts.

HUM 523 Seminar in Hypertext and Textual Studies (5) Several views of hypertext conceptually explored as a basis for research and evaluation of selected hypertext works. Includes initiating the construction of a World Wide Web hypertext of resources for the study of oral, graphical, hand-written, and printed texts. Included in curriculum of Textual Studies Program.

HUM 596 Humanities Research Seminar (1-5, max. 15) Exploration of current research in the Humanities and the study of the arts. Offered by specially selected U.W. faculty and visiting scholars in the arts and humanities.

Chemistry

No more than the number of credits indicated can be counted toward graduation from the following course groups: 120, 142, 145 (5 credits); 152, 155 (5 credits); 145, 155, 160, 162 (11 credits); 162, 165 (6 credits); 165, 312 (5 credits); 220, 223, 237, 335 (5 credits); 238, 336 (4 credits); 221, 224, 239, 337 (5 credits); 241, 346 (3 credits); 242, 347 (3 credits); 355, 452 (3 credits); 452, 456 (3 credits). If a course is

completed before a prerequisite is taken, credit will not later be allowed for the prerequisite course.

CHEM 110 Introduction to General Chemistry (3) NW Introduction to general chemistry with an emphasis on developing problem solving skills. Covers basic concepts of chemistry along with the mathematics required for quantitative problem solving. For students without high school chemistry or with limited mathematics background. Successful completion of CHEM 110 prepares students to enroll in CHEM 142. Credit/no credit only.

CHEM 115 Chemistry for Life (5) NW Introduction to chemistry covering selected principles and their effect on ourselves and our environment. Includes scientific investigations conducted outside the laboratory with full class participation. Intended for non-science majors wishing to improve their science literacy and develop a long-term interest in science.

CHEM 120 Principles of Chemistry I (5) NW, QSR First course in a three-quarter overview of chemistry. Not for students majoring in biochemistry, chemistry, or engineering. Includes matter and energy, chemical nomenclature, chemical reactions, stoichiometry, modern atomic theory, chemical bonding. Laboratory. Only 5 credits can be counted toward graduation from the following: CHEM 120, 142, 145. Offered: AS.

CHEM 142 General Chemistry (5) NW, QSR For science and engineering majors. Atomic nature of matter, stoichiometry, periodic table, quantum concepts, and gas laws. Includes laboratory. Recommended: high school chemistry and placement into MATH 120 or higher. No more than the number of credits indicated can be counted toward graduation from the following course groups: 142, 145 (5 credits). Cannot be taken for credit if CHEM 120 already taken. Offered: AWSpS.

CHEM 145 Honors General Chemistry (5) NW, QSR 145 and 155 cover material in 142, 152, and 162. Integrated computer and chemistry laboratory experiments. Prerequisite: either MATH 124, MATH 127, or MATH 134, any of which may be taken concurrently; score of 43% on CHEMGN placement test. No more than the number of credits indicated can be counted toward graduation from the following course groups: 142, 145 (5 credits); 145, 155, 162 (10 credits). Offered: A.

CHEM 152 General Chemistry (5) NW Energy, enthalpy and thermochemistry, spontaneity, entropy and free energy, electrochemistry, quantum mechanics and atomic theory, general concepts of bonding. Includes laboratory. Prerequisite: either 1.7 in CHEM 142 or 1.7 in CHEM 145. No more than the number of credits indicated can be counted toward graduation from the following course groups: 152, 155 (5 credits). Offered: AWSpS.

CHEM 155 Honors General Chemistry (5) NW Continuation of 145. Includes integrated computer and chemistry laboratory experience. Together 145 and 155 cover material in 142, 152, and 162. No more than the number of credits indicated can be counted toward graduation from the following course groups: 152, 155 (5 credits); 145, 155, 162 (10 credits). Prerequisite: 2.2 in CHEM 145. Offered: W.

CHEM 162 General Chemistry (5) NW Covalent bonding, chemical kinetics, liquids and solids,

properties of solutions, the elements in groups 1A-4A, the elements in groups 5A-8A, transition metals and coordination chemistry, and organic chemistry. Includes laboratory. Prerequisite: 1.7 in CHEM 152. Offered: AWSpS.

CHEM 165 Honors General Chemistry (5) NW Introduction to systematic inorganic chemistry: representative elements, metals, and nonmetals. Includes coordination complexes, geochemistry, and metallurgy. Additional material on environmental applications of basic chemistry presented. Laboratory included. No more than the number of credits indicated can be counted toward graduation from the following course groups: 162, 165 (5 credits); 165, 312 (5 credits). Prerequisite: 2.2 in CHEM 155. Offered: Sp.

CHEM 197 Science Outreach Training (1-2, max. 2) Training for participation in science-related outreach activities to the community. Emphasis on support for K-12 education and environmental community efforts. Not applicable toward chemistry degree requirements. Credit/no credit only. Offered: AWSpS.

CHEM 198 Tutorial Study (2, max. 6) NW Credit/no credit only.

CHEM 199 Special Problems (1-6, max. 6) Research in chemistry. Credit/no credit only. Offered: AWSpS.

CHEM 220 Principles of Chemistry II (5) NW, QSR Second course in a three-quarter overview of chemistry. Not for students majoring in biochemistry, chemistry, or engineering. Includes gases/liquids/solids, solutions, acids and bases, equilibrium, oxidation-reduction, electrochemistry, organic compounds, hydrocarbons, aromaticity, stereochemistry. Prerequisite: either 1.7 in CHEM 120 or 1.7 in CHEM 142. Offered: W.

CHEM 224 Organic Chemistry — Short Program (4) NW Continuation of CHEM 223. Structure, nomenclature, properties, and reactions of aldehydes, ketones, carboxylic acid derivatives, amines, carbohydrates, lipids, amino acids, peptides, proteins, and nucleic acids. No laboratory accompanies this course, but CHEM 241 laboratory may be taken concurrently. No more than 4 credits can be counted toward graduation from the following course group: CHEM 224, CHEM 239, CHEM 337. Prerequisite: 1.7 in CHEM 223. Offered: WS.

CHEM 238 Organic Chemistry (4) NW Second course for students planning to take three quarters of organic chemistry. Further discussion of physical properties and transformations of organic molecules, especially aromatic and carbonyl compounds. No more than the number of credits indicated can be counted toward graduation from the following course groups: 238, 336 (4 credits). Prerequisite: either 1.7 in CHEM 237 or 1.7 in CHEM 335. Offered: WSpS.

CHEM 239 Organic Chemistry (3) NW Third course for students planning to take three quarters of organic chemistry. Polyfunctional compounds and natural products, lipids, carbohydrates, amino acids, proteins, and nucleic acids. Includes introduction to membranes, enzyme mechanisms, prosthetic groups, macromolecular conformations and supramolecular architecture. No more than 4 credits can be counted toward graduation from the following course groups: CHEM 224, CHEM 239, CHEM 337. Prerequisite: either 1.7 in CHEM 238 or 1.7 in CHEM 336. Offered: ASpS.

CHEM 241 Organic Chemistry Laboratory (3)

NW Introduction to organic laboratory techniques. Preparation of representative compounds. Designed to be taken with 224 or 238. No more than the number of credits indicated can be counted toward graduation from the following course groups: 241, 346 (3 credits). Prerequisite: either 1.7 in CHEM 223 or 1.7 in CHEM 237; either CHEM 335, either CHEM 224, CHEM 224 or CHEM 336, any of which may be taken concurrently. Offered: WSpS.

CHEM 242 Organic Chemistry Laboratory (3)

NW Preparations and qualitative organic analysis. Designed to be taken with 239. No more than the number of credits indicated can be counted toward graduation from the following course groups: 242, 347 (3 credits). Prerequisite: either 1.7 in CHEM 224 or CHEM 239 which may be taken concurrently or CHEM 337 which may be taken concurrently; either 1.7 in CHEM 241 or 1.7 in CHEM 346. Offered: ASpS.

CHEM 296 Research in Chemistry: An

Introduction (1) NW Ten presentations describing the research programs of researchers in the chemical sciences. Does not count toward any chemistry major requirement. Credit/no credit only. Offered: W.

CHEM 297 Science Outreach Participation (1-2, max. 6)

Continuation of 197. Work with K-12 schools or community organizations. May include scientific presentations, K-12 curriculum support, or involvement in a community project. Not applicable toward chemistry degree requirements. Credit/no credit only. Prerequisite: CHEM 197. Offered: AWSp.

CHEM 299 Special Problems and Report

Writing (1-6, max. 6) Research in chemistry and/or study in the chemical literature. Requires writing a scientific report. Credit/no credit only. Offered: AWSpS.

CHEM 312 Inorganic Chemistry (3) NW

The periodic table: chemistry of representative and transition elements. Aqueous chemistry, solid state chemistry, and everyday aspects of inorganic chemistry emphasized. Not intended for students who have completed 165. No more than the number of credits indicated can be counted toward graduation from the following course groups: 165, 312 (5 credits). Prerequisite: either CHEM 155 or CHEM 162; either CHEM 224, CHEM 238, or CHEM 336. Offered: AW.

CHEM 317 Inorganic Chemistry Laboratory (4)

NW Experimental exploration of the periodic table. Techniques of preparation and characterization of inorganic compounds. Handling of air-sensitive materials and gases. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 242 or CHEM 347. Offered: WSp.

CHEM 321 Quantitative Analysis (5) NW

Introduction to chemical analysis, including gravimetric, volumetric, spectrophotometric, and potentiometric analyses. Laboratory computer use included. Prerequisite: either CHEM 155 or CHEM 162. Offered: AWS.

CHEM 346 Organic Chemistry Honors

Laboratory (3) NW To accompany 336. No more than the number of credits indicated can be counted toward graduation from the following course groups: 241, 346 (3 credits). Prerequisite: 1.7 in CHEM 335; CHEM 336 which may be taken concurrently. Offered: W.

CHEM 347 Organic and Qualitative Organic

Honors Laboratory (3) NW Continuation of 346.

To accompany 337. No more than the number of credits indicated can be counted toward graduation from the following course groups: 242, 347 (3 credits). Prerequisite: CHEM 337 which may be taken concurrently; 2.2 in CHEM 346. Offered: Sp.

CHEM 355 Introductory Physical Chemistry

for Biologists (4) NW The following topics are discussed from a physical chemical point of view: structural study of biopolymers, enzyme kinetics, bioenergetics, and transport. No more than the number of credits indicated can be counted toward graduation from the following course groups: 355, 452 (3 credits). Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either MATH 124, MATH 134, MATH 145, or Q SCI 291; either PHYS 114 or PHYS 121.

CHEM 396 Research in Chemistry and the

Chemical Sciences (1) NW Presentations by researchers in academia and industry describing the opportunities for research chemistry and biochemistry. Credit does not count toward chemistry major requirements. Credit/no credit only. Prerequisite: CHEM 296. Offered: jointly with BIOC 396; A.

CHEM 397 Science Outreach Mentors (1-2,

max. 6) Mentoring of beginning outreach participants. Includes presentations for 197, training of outreach students, and evaluation of outreach activities. Not applicable toward chemistry degree requirements. Credit/no credit only. Prerequisite: CHEM 197. Offered: AWSp.

CHEM 399 Undergraduate Research (*, max.

12) Research in chemistry. Credit/no credit only. Offered: AWSpS.

CHEM 410 Radiochemistry Laboratory (2) NW

Introductory general service course for students planning further work in nuclear or tracer applications. Safety procedures, detection and measurement of nuclear radiation, radiochemical and tracer techniques. Prerequisite: either 1.7 in CHEM 155 or 1.7 in CHEM 162; recommended: CHEM 418. Offered: alternate years.

CHEM 414 Chemistry of the Main Group

Elements (3) NW The elements and their compounds in relation to the periodic system. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 452 or CHEM 456; either CHEM 453, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 415 The Chemical Bond (3) NW

Nature of the chemical bond. Simple bonding theories, molecular orbital methods, symmetry, and group theory. Includes weekly computer exercises in which students perform ab initio calculations. Prerequisite: either CHEM 453, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 416 Transition Metals (3) NW

Survey of selected key topics in the chemistry of the transition metals, including emphasis on the structure, bonding, and reactivity of major classes of compounds. Prerequisite: either CHEM 165 or CHEM 312; either CHEM 453, CHEM 455, or CHEM 475, which may be taken concurrently. Offered: A.

CHEM 417 Organometallic Chemistry (3) NW

Chemistry of the metal-carbon bond for both main group and transition metals. Structure and reactivity with applications to organic synthesis and catalysis. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: W.

CHEM 418 Nuclear Chemistry (3) NW Natural radioactivity, nuclear systematics and reactions, radioactive decay processes, stellar nucleosynthesis, applications of radioactivity. Prerequisite: either CHEM 453, CHEM 455, or CHEM 475. Offered: alternate years.

CHEM 419 Bioinorganic Chemistry (3) NW

Description of transition metal-containing systems found in biology. Structural and electronic properties and reactivity of metalloproteins, metalloenzymes, and metallocofactors. Methods used to probe and model metal sites by spectroscopic and synthetic techniques. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; CHEM 416. Offered: Sp, even years.

CHEM 426 Instrumental Analysis (3) NW

Introduction to modern instrumental methods of chemical analysis, including chromatography, optical and mass spectroscopy, electrochemistry and flow injection analysis. Basic concepts of transducers, spectrometers, mass analysis, separation sciences, and computerized data acquisition and reduction. Includes laboratory. Prerequisite: CHEM 321. Offered: W.

CHEM 427 Principles of Modern Wet Analysis

(3) NW Sampling and sample dissolution, multiple chemical equilibria, pH and electrochemical measurement, reagent-based kinetic enzyme assays and immunoassays. Principles of process, environmental, clinical, and biotechnological assays. Separations and flow injection. Prerequisite: either CHEM 223, CHEM 237, or CHEM 335; CHEM 321.

CHEM 428 Bioinstrumental Analysis (3) NW

Modern instrumental methods of bioanalysis of DNA and proteins, including agarose gel electrophoresis, PCR, Sanger sequencing for nucleic acid analysis and ELISA, SDS-PAGE, and LC/MS-MS analysis of proteins. Mass analysis, separation sciences, and bioinformatics tools. Includes laboratory. No credit allowed if BIOC 426 taken. Prerequisite: CHEM 239; either CHEM 317, CHEM 321, CHEM 461 or BIOC 440. Offered: Sp.

CHEM 429 Chemical Separation Techniques

(3) NW Introduction to modern separation techniques such as gas chromatography, high-performance liquid chromatography, electrophoresis, and field flow fractionation. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either CHEM 241, CHEM 321, or CHEM 346. Offered: W.

CHEM 433 Theoretical Organic Chemistry —

Predictions and Experimental Tests (3) NW Molecular orbital theory in organic chemistry. Woodward-Hoffmann rules, aromaticity, concerted reactions, photochemical transformations, and reactions of electron-deficient species. Prerequisite: either CHEM 239 or CHEM 337. Offered: alternate years.

CHEM 435 Introductory Biophysical

Chemistry (3) NW Survey of the statics and dynamics of biophysical and biochemical processes. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; either CHEM 453, CHEM 455, or CHEM 475, any of which may be taken concurrently; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; W.

CHEM 436 Molecular Enzymology (3) NW

Enzyme structure, function, chemistry and inhibition, including modes of biological catalysis, stereochemistry, enzyme characterization and

kinetics, and design and principles of enzyme inhibitors. Also major classes of natural products, their chemistry, biological activity, biosynthesis, physiological role, and ecological significance. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: either BIOC 405 or BIOC 440. Offered: alternate years; Sp.

CHEM 437 Organic and Bioorganic Chemistry of Nucleic Acids in Proteins (3) NW Chemistry of DNA, RNA, peptides, and proteins. Solid phase chemical synthesis. Manual and automated sequencing. Conformational analysis. Peptide mimetics and protein design. Interaction of DNA with drugs and toxins. Triple helices and antisense oligonucleotides. Prerequisite: either CHEM 239 or CHEM 337.

CHEM 452 Physical Chemistry for Biochemists I (3) NW General equilibrium thermodynamics emphasizing biochemical applications: ligand binding, biological oxidation-reduction reactions, membranes, active transport, colligative properties, and surface tension. No more than the number of credits indicated can be counted toward graduation from the following course groups: 355, 452 (4 credits); 452, 456 (3 credits). Prerequisite: either CHEM 155 or CHEM 162; either MATH 125 or MATH 134; either PHYS 115 or PHYS 122. Offered: AW.

CHEM 453 Physical Chemistry for Biochemists II (3) NW Continuation of 452. Includes transport properties, enzyme kinetics, introduction to quantum mechanics, spectroscopy, and classical statistical mechanics. Prerequisite: either CHEM 452 or CHEM 456; either MATH 126 or MATH 135; either PHYS 116 or PHYS 123. Recommended: MATH 307; MATH 308. Offered: WSp.

CHEM 455 Physical Chemistry (3) NW Introduction to quantum chemistry and spectroscopy. Theory of quantum mechanics presented at an elementary level and applied to the electronic structure of atoms and molecules and to molecular spectra. Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: ASp.

CHEM 456 Physical Chemistry (3) NW Chemical thermodynamics. Laws of thermodynamics presented with applications to phase equilibria, chemical equilibria, and solutions. No more than the number of credits indicated can be counted toward graduation from the following course groups: 452, 456 (3 credits). Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307. Offered: WS.

CHEM 457 Physical Chemistry (3) NW Introduction to statistical mechanics, kinetic theory, and chemical kinetics. Prerequisite: either CHEM 455 or CHEM 475; either CHEM E 326 which may be taken concurrently, CHEM 456 or CHEM 476. Offered: W.

CHEM 458 Global Atmospheric Chemistry (4) NW Global atmosphere as chemical system. Physical factors and chemical processes. Natural variabilities and anthropogenic change. Cycling of trace substances. Global issues such as climate change, acidic deposition, influences on biosphere. Prerequisite: either ATM S 358 or CHEM 456. Offered: jointly with ATM S 458.

CHEM 460 Spectroscopic Molecular Identification (3) NW Basic theory of spectral

techniques-infrared and ultraviolet/visible spectroscopy, NMR, and mass spectrometry-with emphasis on spectral interpretation skills needed for the elucidation of structure, conformation, and dynamics in organic and biological chemistry. Prerequisite: either CHEM 224, CHEM 239, or CHEM 337; recommended: either CHEM 455 or CHEM 475. Offered: A.

CHEM 461 Physical Chemistry Laboratory (3-4) NW Physical measurements in chemistry. Vacuum techniques, calorimetry, spectroscopic methods, electrical measurements. Prerequisite: either CHEM 453, or both CHEM 455 and CHEM 456, or both CHEM 456 and CHEM 475; recommended CHEM 457. Offered: ASpS.

CHEM 462 Techniques of Synthetic Organic Chemistry (2-3) NW Laboratory techniques of synthetic organic chemistry. Vacuum distillation, multistep synthesis, air sensitive reagents, photochemistry, chromatography, and separation techniques. Prerequisite: either CHEM 242 or CHEM 347; CHEM 460 which may be taken concurrently. Offered: A.

CHEM 463 Spectroscopic Techniques for Structural Identification (2) NW Laboratory techniques of spectroscopic analysis for structural determination using UV, IR, NMR, mass spectroscopy. Prerequisite: CHEM 460. Offered: W.

CHEM 464 Computers in Data Acquisition and Analysis (3) NW Introduction to use of the computer in the chemistry laboratory. Principles of microcomputers and their use for such problems as data acquisition, noise reduction, and instrument control. Prerequisite: either CHEM 453, CHEM 455, or CHEM 475; MATH 136, or both MATH 307 and MATH 308. Offered: Sp.

CHEM 465 Computations in Chemistry (3) NW Computer calculations on color graphics workstations applied to problems in chemistry. Numerical methods and algorithms for calculating classical dynamics, quantum wavefunctions, wavepacket propagation, chemical kinetics. Use of computer programs for calculating electronic wavefunctions, molecular conformations, simulations of liquids and solids. Prerequisite: either CHEM 455 or CHEM 475, either of which may be taken concurrently. Offered: W.

CHEM 471 Physical Chemistry of Macromolecules (3) NW Classical hydrodynamic methods, and modern optical correlation and pulse techniques for studying dynamical motions and conformations of macromolecules, especially biopolymers, in solution. Cooperative thermal transitions, optical properties, and polyelectrolyte effects. Prerequisite: either CHEM 452, CHEM 456, or CHEM 476; either CHEM 453, CHEM 457, or CHEM 477. Offered: alternate years; W.

CHEM 475 Honors Physical Chemistry (3) NW Introduction to quantum chemistry, spectroscopy. Theory of quantum mechanics applied more rigorously than in CHEM 455. Application of quantum mechanics to electronic structure of atoms and molecules. Computer software used to solve problems. Prerequisite: either CHEM 155 or CHEM 162; either MATH 126 or MATH 136; either PHYS 116 or PHYS 123; recommended: MATH 307; MATH 308. Offered: A.

CHEM 476 Honors Physical Chemistry (3) NW For chemistry and biochemistry majors and otherwise qualified students. Chemical

Thermodynamics. Similar in scope to CHEM 456 with the study of more complicated systems. Emphasis on using computer software to solve problems. Prerequisite: CHEM 475. Offered: W.

CHEM 477 Honors Physical Chemistry (3) NW For chemistry and biochemistry majors or otherwise qualified students. Statistical mechanics, kinetic theory, and chemical kinetics including statistical interpretations of kinetics and transport phenomena. Prerequisite: CHEM 475; either CHEM E 326, which may be taken concurrently, or CHEM 476. Offered: Sp.

CHEM 484 Materials Chemistry (3) NW Overview of basic principles, techniques, and applications associated with solid materials. Topics include description of crystals, examples of crystal structures, structural analysis, band structures of solid materials, preparation of materials, materials for microelectronics, and materials for information technology. Prerequisite: CHEM 453 or CHEM 455. Offered: jointly with MSE 484; Sp.

CHEM 496 Research Seminar for Undergraduates (1, max. 2) NW Formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Offered: jointly with BIOC 496; Sp.

CHEM 498 Teaching Chemistry (3) NW Training in teaching chemistry laboratory and quiz sections. For chemistry and biochemistry majors, especially those planning graduate work or secondary education. Covers teaching strategies, student diversity, learning styles, grading, and interaction with students and faculty. Credit/no credit only. Offered: A.

CHEM 499 Undergraduate Research and Report Writing (*, max. 12) Research in chemistry and/or study in the chemical literature. Credit/no credit only. Offered: AWSpS.

CHEM 501 Readings in Chemistry (1, max. 9) Individual meetings with faculty to discuss readings (journal articles, book chapters, proceedings) in the chemical sciences. Credit/no credit only. Offered: AWSpS.

CHEM 502 Practical NMR Methods for Biological and Organic Structure Elucidation (4) Theory of NMR (rotating frame formalism, multi-pulse experiments, relaxation phenomena, 2D experiments) as applied to structural and dynamic problems in organic and biological chemistry. Provides basis for experiment selection and spectrum interpretation. A more advanced treatment of NMR than 460. Prerequisite: CHEM 224, CHEM 239, or CHEM 337; recommended: CHEM 460 or equivalent, CHEM 435 or CHEM 455. Offered: W.

CHEM 508 Advanced Inorganic Chemistry (3, max. 9) Discussion of selected applications of physical techniques to the study of inorganic molecules. Topics include group theory, magnetic resonance spectroscopy (NMR and ESR), vibrational spectroscopy (IR and Raman), electronic spectroscopy, magnetism, and electrochemistry. Offered: A.

CHEM 510 Current Problems in Inorganic Chemistry (3, max. 9) Primarily for doctoral candidates in inorganic chemistry. Current topics (e.g., bioinorganic, advanced organometallic, materials and solid state, advanced inorganic spectroscopy). See department for instructor and topics during any particular quarter. Offered: Sp.

CHEM 520 Current Problems in Analytical Chemistry (3, max. 9) Primarily for doctoral candidates in analytical chemistry. Current topics (e.g., flow injection analysis, mass spectrometry, and advanced radiochemistry). See department for instructor and topics during any particular quarter. Offered: AW.

CHEM 521 Analytical Electrochemistry (3) Theory and practice of modern electrochemistry with emphasis on instrumentation and applications in chemical analysis. Offered: alternate years.

CHEM 522 Atomic and Molecular Analytical Spectroscopy (3) Quantitative analysis of atomic and molecular species, using all forms of electromagnetic radiation, electrons, and gaseous ions. Offered: alternate years.

CHEM 523 Geochemical Cycles (4) Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with OCEAN 523/ATM S 508.

CHEM 525 Process Analytical Chemistry (3) Chemical sensors and systems approach to chemical analysis as an integral part of monitoring and controlling chemical, biological, and medical processes. Offered: alternate years.

CHEM 526 Chemometrics (3, max. 9) Mathematical and statistical methods for experimental design, calibration, signal resolution, and instrument control and optimization. Offered: alternate years.

CHEM 530 Advanced Organic Chemistry (3) Fundamental aspects of organic structures and transformations. Structure and basicity of carbanions, substitution reactions, elimination reactions, nucleophilic addition and addition/elimination reactions, condensation reactions, structure and rearrangements of carbocations, electrophilic addition, electrophilic substitutions, neighboring group effects. Prerequisite: CHEM 337. Offered: A.

CHEM 531 Advanced Organic Chemistry (3) Synthetic organic chemistry. Discussion of practical methods for the synthesis of complex organic molecules with an emphasis on strategy and the control of stereochemistry. Prerequisite: CHEM 530. Offered: W.

CHEM 532 Advanced Organic Chemistry (3) Chemical Biology. Application of chemical methods to the study of biological processes that occur in cells. Prerequisite: CHEM 530 and CHEM 531. Offered: Sp.

CHEM 540 Current Problems in Organic Chemistry (1-3, max. 12) Primarily for doctoral candidates in organic chemistry. Discussions of topics of current interest and importance. See department for instructor and topic during any particular quarter.

CHEM 550 Introduction to Quantum Chemistry (3) Origins and basic postulates of quantum mechanics, solutions to single-particle problems, angular momentum and hydrogenic wave functions, matrix methods, perturbation theory, variational methods. Prerequisite: CHEM 455. Offered: A.

CHEM 551 Introduction to Quantum Chemistry (3) Electronic structure of many-electron atoms and molecules, vibration and rotation levels of molecules, effects of particle exchange, angular momentum and group theory, spectroscopic selection rules. Prerequisite: CHEM 550. Offered: W.

CHEM 552 Statistical Mechanics (3) General theorems of statistical mechanics, relation of the equilibrium theory to classical thermodynamics, quantum statistics, theory of imperfect gases, lattice statistics and simple cooperative phenomena, lattice dynamics and theory of solids, liquids, solutions, and polymers, time-dependent phenomena and mechanisms of interaction. Prerequisite: CHEM 455 and CHEM 456 (concurrent registration permitted) or equivalent. Offered: Sp.

CHEM 553 Statistical Mechanics (3) General theorems of statistical mechanics, relation of the equilibrium theory to classical thermodynamics, quantum statistics, theory of imperfect gases, lattice statistics and simple cooperative phenomena, lattice dynamics and theory of solids, liquids, solutions, and polymers, time-dependent phenomena and mechanisms of interaction. Prerequisite: CHEM 552. Offered: A.

CHEM 560 Current Problems in Physical Chemistry (1-3, max. 12) Primarily for doctoral candidates in physical chemistry. A discussion of topics selected from active research fields. See department for instructor and the topic during any particular quarter.

CHEM 561 Macromolecules (3, max. 9) Physical chemistry of macromolecules and biopolymers. Topics include solution thermodynamics, hydrodynamic properties, molecular weight distributions, optical and electro-optic techniques, chain configuration statistics, cooperative phenomena, theory of rubber elasticity, and polyelectrolytes. Offered: alternate years.

CHEM 564 Organic Electronic and Photonic Materials/Polymers (3) Physical and material concepts determining properties of organic electronic and photonic materials. Discusses electronic structure, physico-chemical characterization, and device application. Includes introduction of electronic band structure of polymers, electrically conducting polymers; organic nonlinear optical electroluminescent materials; polymer optical fibers; tow-photon absorption materials for 3-D microfabrication. Offered: jointly with MSE 560.

CHEM 575 Molecular Modeling Methods (4) Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with BIOEN 575; A.

CHEM 590 Seminar in General Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSp.

CHEM 591 Seminar in Inorganic Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSp.

CHEM 592 Seminar in Analytical Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSp.

CHEM 593 Seminar in Organic Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSp.

CHEM 595 Seminar in Physical Chemistry (1, max. 18) For chemistry graduate students only. Credit/no credit only. Offered: AWSp.

CHEM 600 Independent Study or Research (*) Prerequisite: permission of coordinator. Offered: AWSpS.

CHEM 700 Master's Thesis (*) Prerequisite: permission of coordinator. Offered: AWSpS.

CHEM 800 Doctoral Dissertation (*) Prerequisite: permission of coordinator. Offered: AWSpS.

Classics

Classical Archaeology

CL AR 340 Pre-Classical Art and Archaeology (3) VLPA Survey of the art and the other material remains of the civilizations in the Aegean from the Neolithic Age to the end of the Bronze Age, with special emphasis on Minoan Crete and the Mycenaean kingdoms of mainland Greece, illustrated by slides. The history, techniques, and results of significant excavations are examined. Offered: jointly with ART H 340.

CL AR 341 Greek Art and Archaeology (3) VLPA *Bliquez* Survey of the material remains and the developing styles in sculpture, vase painting, architecture, and the minor arts from the geometric to the Hellenistic periods, illustrated by slides. Principal sites and monuments, as well as techniques and methods of excavation, are examined in an attempt to reconstruct the material culture of antiquity. Offered: jointly with ART H 341.

CL AR 342 Roman Art and Archaeology (3) VLPA *Harmon* Roman architecture and art, with emphasis on the innovations of the Romans; illustrated by slides. Offered: jointly with ART H 342.

CL AR 343 Hellenistic Art and Archaeology (3) VLPA Survey of the art of Greece and the eastern Mediterranean from the time of Alexander the Great to the Roman conquest. Principal sites with their sculpture, painting, mosaics, and minor arts examined in lectures illustrated with slides. Offered: jointly with ART H 343.

CL AR 442 Greek Painting (3) VLPA Study of painted decoration on Greek vases, with emphasis on stylistic developments and cultural and historical influences. Painting on other media also examined as evidence allows. Offered: jointly with ART H 442.

CL AR 443 Roman Painting (3) VLPA Study of surviving painting from the Roman World, with emphasis on wall paintings from Pompeii and Herculaneum. Principal topics for discussion: the four styles of Pompeian painting the dependence of Roman painters on Greek prototypes, and the significance of various kinds of painting as domestic decoration. Offered: jointly with ART H 443.

CL AR 444 Greek and Roman Sculpture (3) VLPA History and development of Greek

sculpture and sculptors, their Roman copyists, and Roman portraits and sarcophagi. Emphasis on Greek sculpture of the fifth century BC. Offered: jointly with ART H 444.

CL AR 446 Greek Architecture (3) VLPA
Detailed study of Greek architecture from its beginnings, with special emphasis on the Periclean building program in fifth-century Athens. Offered: jointly with ARCH 454/ART H 446.

CL AR 447 The Archaeology of Early Italy (3) VLPA Harmon Study of the principal archaeological sites of early Italy, including Etruria, Sicily, southern Italy, and archaic Rome up to the Republican period. Attention given to the material remains and their relationship to the Etruscan, ancient Sicilian, and early Roman civilizations. Offered: jointly with ART H 447.

CL AR 448 The Archaeology of Italy (3) VLPA Harmon Study of the principal archaeological sites in Italy with special emphasis on ancient Rome. Sites include the Alban hills, Ostia, Pompeii, Herculaneum, Tarquinia, Paestum, Tivoli, and Praeneste. Attention given to the relationship between material remains and their purpose in ancient life. Illustrated by slides. Offered: jointly with ART H 448.

CL AR 513 Athenian Topography (5) Detailed consideration of the topography and monuments of ancient Athens from the beginning through the Roman period.

CL AR 541 Seminar in Greek and Roman Art (3) In-depth study of selected topics and problems of the art of ancient Greece and Rome. Offered: jointly with ART H 541.

Classical Linguistics

CL LI 501 Comparative Phonology of Greek and Latin (5) Harmon Phonological developments of Greek and Latin from Indo-European to the classical periods of both languages.

CL LI 503 History of the Greek Language (5) Morphological and syntactical development of the Greek language from Homer through the New Testament; the development of prose and poetic style.

CL LI 505 History of the Latin Language (5) Harmon Morphological and syntactical development of the Latin language; the development of Latin as a literary language.

CL LI 506 Italic Dialects (5) Harmon Principal remains of the non-Latin languages and dialects of ancient Italy.

CL LI 508 Greek Dialects (5) The non-Attic dialects of ancient Greek, based on a study of inscriptions and the literary remains.

Classics

Upper-division classics courses in English (300 and 400 level) in the Department of Classics do not generally have prerequisites. Most 400-level courses deal with a single genre of literature or with a limited area of classical studies. The 300-level courses deal with broader subjects at a relatively advanced level. Both are primarily for juniors and seniors, but they are open to freshmen and sophomores with an interest or background in the subject of the course.

CLAS 101 Latin and Greek in Current Use (2) VLPA Designed to improve and increase English vocabulary through a study of the Latin and Greek elements in English, with emphasis on words in current literary and scientific use. No auditors. Knowledge of Latin or Greek is not required. Offered: AWSpS.

CLAS 102 Grammar and Syntax through Latin (3) VLPA Improve familiarity with basic grammar, syntax, logic through study of mechanics of the Latin language. For Educational Opportunity Program students only. No auditors. Knowledge of Latin or Greek not required.

CLAS 122 Gateway to the Ancient Greco-Roman World (5) VLPA Introduces students to aspects of Ancient Greek and/or Roman literature and culture. Develop understanding of the nature and process of critical thinking and basic research techniques.

CLAS 205 Bioscientific Vocabulary Building From Latin and Greek (3) VLPA Designed to help the student master the scientific vocabulary of his or her particular field by a study of the Latin and Greek roots that are used to create the majority of scientific terms. No auditors. Knowledge of Latin or Greek is not required. Offered: AWSpS.

CLAS 210 Greek and Roman Classics in English (5) VLPA Bliquez, Blondell, Clauss, Connors, Gowing, Harmon, Hinds, Levaniouk, Power, Stroup Introduction to classical literature through a study of the major Greek and Latin authors in modern translation. Offered: AWSp.

CLAS 320 Greek and Roman Private and Public Life (5) I&S/VLPA Bliquez Study of the civic and social practices and institutions of everyday Greek and Roman private and public life, including the family, social classes, the courts and legal systems, military service and war, technology and the trades, money and banking, agriculture and rural life. Many lectures illustrated by slides. Offered: A.

CLAS 322 Intellectual History of Classical Greece (5) I&S/VLPA Blondell Uses Plato's *Republic* as a core text to explore a range of issues of ancient and contemporary interest, such as justice, political theory, male attitudes toward women, and the nature of the soul. Besides the *Republic* and other works of Plato, readings are taken from Homer, tragedy, comedy, Aristotle, and others. Offered: Sp.

CLAS 324 Greek and Roman Athletics (3) I&S Greek and Roman athletic festivals and events, and the place of athletes and sport in ancient society.

CLAS 326 Women in Antiquity (3) I&S/VLPA Connors, Levaniouk A broad survey of primary sources in medicine, law, philosophy, religious ritual, myth, history, and ethnography, informed by perspectives from literature, art, and archaeology. Provides students the tools to analyze the social roles of women in ancient Greece and Rome.

CLAS 328 Sex, Gender, and Representation in Greek and Roman Literature (3) I&S/VLPA Hinds, Stroup Affirmation and inversion of gender roles in Greek and Roman literature, myths of male and female heroism; marginalization of female consciousness; interaction of gender, status, and sexual preference in love poetry. Readings from epic, drama, historiography, romance, and lyric.

CLAS 330 The Age of Augustus (5) I&S/VLPA Gowing Detailed study of the history and culture of the reign of Augustus, the first Roman emperor (31 BC-AD 14). Includes readings in Augustan authors such as Vergil, Ovid, and Horace as well as the study of Augustan art and architecture. Offered: jointly with HSTAM 330.

CLAS 399 Study Abroad: Classics (3-15, max. 20) VLPA For participants in Classics overseas study programs. Specific course content determined by assigned faculty member. Credit not applicable to majors in the Classics Department without approval.

CLAS 401 Undergraduate Seminar in Classics (3-5) VLPA Seminar on a broadly defined topic in classics. Includes reading in Latin or Greek as appropriate for individual students. Additional readings of works in English translation and works of scholarship chosen to give undergraduate majors familiarity with research methods and perspective on the discipline.

CLAS 424 The Epic Tradition (5) VLPA Clauss, Levaniouk Ancient and medieval epic and heroic poetry of Europe in English: the *Iliad*, *Odyssey*, and *Aeneid*; the *Roland* or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies according to instructor's preference. Offered: jointly with C LIT 424.

CLAS 427 Greek and Roman Tragedy in English (5) VLPA Stroup Study of the development of Greek and Roman tragedy, with extensive readings in representative plays of Aeschylus, Sophocles, Euripides, and Seneca.

CLAS 428 Greek and Roman Comedy in English (3) VLPA Power, Stroup Readings from the comedies of Aristophanes, Plautus, and Terence.

CLAS 430 Greek and Roman Mythology (3/5) VLPA Principal myths found in classical and later literature. Offered: AWSp.

CLAS 432 Classical Mythology in Film (3/5) VLPA Clauss Comparison and discussion of classical myths and modern films inspired by them. Promotes access to the reading of classical mythology. Analyzes significant differences between ancient literary and modern cinematographic representations of the myth.

CLAS 435 The Ancient Novel (3) VLPA Connors, Power Reading and discussion of the principal Greek and Roman novels, the earliest European prose fiction, with attention to earlier literature and to imperial culture.

CLAS 445 Greek and Roman Religion (3) I&S/VLPA Harmon, Levaniouk Religion in the social life of the Greeks and Romans, with emphasis placed on their public rituals and festivals. Attention is given to the priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Many lectures illustrated by slides. Recommended: RELIG 201. Offered: jointly with RELIG 445.

CLAS 495 Senior Essay (1-3, max. 4) VLPA Usually written in conjunction with another course in the final year of study in the major.

CLAS 496 Special Topics (2-5, max. 15) VLPA Offered occasionally by visitors or resident

faculty.

CLAS 520 Seminar (5, max. 45) Advanced comparative work on Greek and Latin materials studied in both original languages.

CLAS 525 Proseminar (5) Introduces graduate students to the chief subfields, together with their various methodologies and resources, of the broad discipline of classical studies.

CLAS 700 Master's Thesis (*) .

CLAS 800 Doctoral Dissertation (*) .

Greek

GREEK 101 Elementary Greek (5) An intensive study of grammar, with reading and writing of simple Attic prose. Offered: A.

GREEK 102 Elementary Greek (5) An intensive study of grammar, with reading and writing of simple Attic prose. Prerequisite: GREEK 101. Offered: W.

GREEK 103 Elementary Greek (5) Reading of selections from classical Greek literature. Prerequisite: GREEK 102. Offered: Sp.

GREEK 300 Greek Language, Accelerated (5) Intensive introduction to Attic Greek. Not accepted as upper-division credit toward a major in Greek or classics. Does not satisfy foreign language proficiency requirement. Cannot be taken for credit if GREEK 101 already taken. Offered: W.

GREEK 301 Greek Language, Accelerated (5) Intensive introduction to Attic Greek. Not accepted as upper-division credit toward a major in Greek or classics. Does not satisfy foreign language proficiency requirement. Cannot be taken for credit if GREEK 101 already taken. Prerequisite: GREEK 300. Offered: Sp.

GREEK 305 Attic Prose (5) VLPA Translation of selections from Attic prose; elementary exercises in Attic prose composition. Recommended: GREEK 103, GREEK 301, or equivalent.

GREEK 306 Attic Prose (5) VLPA Translation of selections from Attic prose; elementary exercises in Attic prose composition. Prerequisite: GREEK 305.

GREEK 307 Homer (5) VLPA Translation of selections from the *Iliad* or the *Odyssey*; Attic prose composition, metrics. Prerequisite: GREEK 306. Offered: Sp.

GREEK 308 Introduction to Koine Greek Texts (3) VLPA Williams Reading and discussion of selected religious and philosophical texts from Koine Greek.

GREEK 413 The Pre-Socratic Philosophers (3) VLPA Blondell Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 414 Plato (3) VLPA Blondell Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 415 Aristotle (3) VLPA Blondell Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 422 Herodotus and the Persian Wars (3) VLPA Bliquez, Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 424 Thucydides and the Peloponnesian War (3) VLPA Bliquez Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 426 Attic Orators (3) VLPA Bliquez, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 428 Imperial Greek Literature (3-5, max. 15) VLPA Clauss, Gowing Readings in imperial Greek prose and poetry from the first century CE onward, including Dio Chrysostom, Appian, Plutarch, Aelius Aristides, Lucian, Athenaeus, and New Testament Koine. Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 442 Greek Drama (3) VLPA Blondell, Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 443 Greek Drama (3) VLPA Blondell, Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 444 Greek Drama (3) VLPA Blondell, Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 449 Greek Epic (3) VLPA Levaniouk Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 451 Lyric Poetry (3) VLPA Blondell, Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 453 Pindar: The Epinician Odes (3) VLPA Levaniouk, Power Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 461 Early Greek Literature (3-5, max. 15) VLPA Readings and discussion of selected authors of the early Greek period. Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 462 Literature of Classical Athens (3-5, max. 15) VLPA Readings and discussion of selected authors of classical Athens. Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 463 Hellenistic Greek Literature (3-5, max. 15) VLPA Clauss Readings and discussion of selected authors of the Hellenistic Age. Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 490 Supervised Study (*, max. 18) Special work in literary and philosophical texts for graduates and undergraduates. Recommended: minimum of two years of ancient Greek language study at college level (or equivalent).

GREEK 500 Grammar and Composition (5) Bliquez, Blondell Translation of passages from English to Greek for the purpose of acquiring advanced knowledge of the grammar and the style of the classical tongue.

GREEK 501 Homer (5) Levaniouk Readings from the *Iliad* or the *Odyssey*.

GREEK 503 Aristophanes (5) Bliquez Select comedies.

GREEK 504 Plato (5) Blondell The Republic or other dialogues.

GREEK 506 Aristotle (5) Blondell .

GREEK 508 Lysias and Demosthenes (5) Bliquez Select speeches, oratorical theory, historical questions.

GREEK 510 Greek Historians (5, max. 10) Bliquez .

GREEK 512 Greek Tragedy (5, max. 10) Aeschylus, Sophocles, and/or Euripides.

GREEK 515 Greek Epigraphy (5) Selected inscriptions from various Greek states and sanctuaries and evidence they provide for religious and social practices, literature, and political history. Classification and editing of inscriptions, and epigraphical techniques.

GREEK 520 Seminar (5, max. 45) .

GREEK 590 Supervised Study (*, max. 18) Prerequisite: permission of graduate program coordinator.

GREEK 600 Independent Study or Research (*)

Latin

LATIN 101 Elementary Latin (5) An intensive study of grammar, with reading and writing of simple Latin prose. Offered: A.

LATIN 102 Elementary Latin (5) An intensive study of grammar, with reading and writing of simple Latin prose. Prerequisite: LATIN 101. Offered: W.

LATIN 103 Elementary Latin (5) Reading of selections from classical Latin literature. Prerequisite: LATIN 102. Offered: Sp.

LATIN 300 Latin Language, Accelerated (5) Intensive introduction to classical Latin. Not accepted as upper-division credit toward a major in Latin or classics. Does not satisfy foreign language proficiency requirement. Cannot be taken for credit if LATIN 101 already taken. Offered: W.

LATIN 301 Latin Language, Accelerated (5) Intensive introduction to classical Latin. Not accepted as upper-division credit toward a major in Latin or classics. Does not satisfy foreign language proficiency requirement. Cannot be taken for credit if LATIN 101 already taken. Prerequisite: LATIN 300. Offered: Sp.

LATIN 305 Introduction to Latin Literature (5) VLPA Readings in prose and poetry from various Latin authors; elementary exercises in Latin prose composition. Recommended: LATIN 103, LATIN 301, or equivalent. Offered: A.

LATIN 306 Cicero and Ovid (5) VLPA Readings from the orations of Cicero and the poetry of Ovid; elementary exercises in Latin prose composition. Prerequisite: LATIN 305. Offered: W.

LATIN 307 Vergil (5) VLPA Selections from the first six books of the *Aeneid*; elementary exercises in Latin prose composition or metrics. Prerequisite: LATIN 306. Offered: Sp.

LATIN 401 Medieval Latin Literature to 1200 (3) VLPA *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

LATIN 402 Later Medieval and Renaissance Latin Literature (3) VLPA *Hinds* Texts read in Latin; cultural and historical contexts discussed. Presupposes year and a half of Latin or equivalent. Informal individual guidance available to members of class handling medieval or renaissance Latin texts in their research. Recommended: LATIN 306.

<↳ Recommended background for the following 400-level Latin courses is four years of high-school Latin, LATIN 307, or permission of instructor.

LATIN 412 Lucretius (3) VLPA *Blondell, Clauss* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 414 Seneca (3) VLPA *Blondell, Stroup* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 422 Livy (3) VLPA *Clauss, Gowing* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 423 Cicero and Sallust (3) VLPA *Clauss, Gowing, Stroup* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 424 Tacitus (3) VLPA *Clauss, Gowing* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 447 Roman Lyric (3) VLPA *Clauss, Harmon* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 449 Roman Elegy (3) VLPA *Harmon, Hinds* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 451 Roman Satire (3) VLPA *Connors, Stroup* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 457 Roman Drama (3) VLPA *Connors* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 458 Roman Epic (3) VLPA *Clauss, Connors, Harmon, Hinds* Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 461 Latin Literature of the Republic (3-5, max. 15) VLPA Readings and discussion of

selected authors from the era of the Roman Republic. Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 462 Latin Literature of the Augustan Age (3-5, max. 15) VLPA Readings and discussion of selected authors from the Augustan era. Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 463 Latin Literature of the Empire (3-5, max. 15) VLPA Readings and discussion of selected authors from the Roman Empire. Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 465 Roman Topography and Monuments (5, max. 10) VLPA *Clauss, Gowing, Harmon, Stroup* Study of the material remains of ancient Rome from the archaic period through the imperial age. Reading of source materials and inscriptions in Latin. Conducted in Rome. Recommended: minimum of two years of Latin language study at college level (or equivalent). Offered: Sp.

LATIN 490 Supervised Study (*, max. 18) Special work in literary and philosophical texts for graduates and undergraduates. Recommended: minimum of two years of Latin language study at college level (or equivalent).

LATIN 500 Grammar and Composition (5) *Clauss, Gowing, Hinds, Stroup* Translation of passages from English to Latin for the purpose of acquiring advanced knowledge of the grammar and style of the classical tongue.

LATIN 501 Vergil (5) *Clauss, Harmon, Hinds* .

LATIN 502 Horace (5) *Clauss, Harmon* .

LATIN 503 Plautus and Terence: Early Republican Literature (5) *Blondell, Connors, Stroup* .

LATIN 504 Philosophy at Rome (5) *Blondell, Stroup* Selected philosophical works of Cicero and other sources for Hellenistic and Roman philosophy.

LATIN 506 Cicero (5) *Gowing, Stroup* Select speeches, with attention to rhetorical theory and/or letters.

LATIN 508 Silver Latin Literature (5) *Connors, Hinds* .

LATIN 510 Roman Historians (5, max. 10) *Clauss, Gowing* .

LATIN 512 Augustan Poetry (5, max. 15) .

LATIN 520 Seminar (5, max. 45) .

LATIN 565 Seminar in Rome (5, max. 10) *Clauss, Gowing, Harmon, Stroup* Study of selected topics and authors in Latin literature. Conducted in Rome.

LATIN 590 Supervised Study (*, max. 18) Prerequisite: permission of graduate program coordinator.

LATIN 600 Independent Study or Research (*).

Communication

COM 201 Introduction to Communication I (5) I&S Introduces students to four core principles that undergird the study and practice of communication — communication literacy, research inquiry, theories and concepts, and community engagement. Principles discussed and developed in the context of international communication, political communication, and communication technology and society.

COM 202 Introduction to Communication II (5) I&S/VLPA Introduces students to four core principles that undergird the study and practice of communication — communication literacy, research inquiry, theories and concepts, and community engagement. Principles discussed and developed in the context of social interaction, rhetoric and critical studies, and communication and culture.

COM 220 Introduction to Public Speaking (5) I&S/VLPA Designed to increase competence in public speaking and the critique of public speaking. Emphasizes choice and organization of material, sound reasoning, audience analysis, and delivery.

COM 222 Speech Communication in a Free Society (3) I&S/VLPA Problems and arguments related to freedom of speech; early English writers on freedom of expression; background of freedom of speech in the United States; contemporary freedom of speech issues.

COM 234 Public Debate (5) I&S/VLPA Examines public debate in a democracy by developing a rhetorical perspective of public argument and skills to evaluate debates critically. Develops an understanding of rhetoric, values, audiences, tests of reasoning, and sources of information. Sharpens critical skills and applies them to contemporary controversies in the public sphere.

COM 251 Interviewing (5) I&S/VLPA Interviewing principles and practices, with emphasis on information gathering, selection, and persuasive interviews. Purposes and types of interviews, structure of interviews, and influence of communication patterns on interview outcomes.

COM 270 Interpersonal Communication (5) I&S/VLPA Emphasizes analyzing and understanding communication variables affecting human relationships, such as person perception, feedback, idea development, nonverbal cues. Focus on informal communication settings.

COM 273 Parliamentary Procedure (3) I&S/VLPA Principles and practice: a study of the historical bases and contemporary uses of parliamentary procedure; methods and practice in organizing and conducting public meetings.

COM 300 Basic Concepts of New Media (5) I&S/VLPA Provides a comprehensive examination of the effects of new, digital media on interpersonal communication, media industries, and media culture. Emphasis on economic, social, political, and aesthetic implications. Provides limited experience with computer-based media. No prior technical computer experience assumed.

COM 301 Navigating Information Networks for Mass Media (5) I&S Builds familiarity with computer-mediated information networks. Introduces and compares network search engines, agents, browsing/viewing tools and

retrieval/transfer software for use by reporters and other media workers. Instruction and practice with searching/acquiring information, its analysis and interpretation, illustration, and write-up. No prior computer or network experience assumed.

COM 302 The Cultural Impact of Information Technology (5) I&S/VLPA Utilizing approaches from the history of technology, cultural studies, and literary theory, seeks to analyze the cultural and social impact of information technology. Considers how information technologies impact our relationships with others, our concept(s) of self, and the structure of the communities to which we belong. Offered: jointly with CHID 370.

COM 304 The Press and Politics in the United States (5) I&S Journalist's role in elections and public policy. Relationship between news coverage and political campaigns. Study and analysis of local political newswriting, reporting, and response by local and state political figures. Offered: jointly with POL S 304.

COM 305 The Politics of Mass Communication in America (5) I&S Role of mass audiences in politics from the standpoint of the communication strategies used to shape their political involvement. Topics include: social structure and political participation, political propaganda and persuasion, the political uses of public opinion, and the mass media and politics. Offered: jointly with POL S 305.

COM 306 Media, Society and Political Identity (5) I&S Explores how society and culture are both represented in and shaped by communication technologies and media content. Media include film, advertising, news, entertainment television, talk shows, and the Internet. Explores how media represent and affect individual identity, values, and political engagement. Offered: jointly with POL S 306.

COM 320 Public Speaking (5) I&S/VLPA Practice in preparation and presentation of a variety of types of public speeches based on study of their structure and form; emphasis on organization and delivery. Prerequisite: COM 220.

COM 321 Communications in International Relations (5) I&S Looks at communications in relations between international groups and states. Examines the range of functions and roles communication media play in international affairs, global issues, and intergroup relations. Also examines the strategic use of communications by various groups. Offered: jointly with POL S 330.

COM 322 Global Communication (5) I&S Introduction to the history, purpose, channels, content, technologies, policy, and regulation of international communications systems. Issues covered include disparities in media development between post-industrial and developing nations, imbalances in international news and information flow, and the emergence of global communications. Offered: jointly with POL S 329.

COM 329 Rhetoric of Social and Political Movements (5) I&S/VLPA Inquiry into the rhetoric of social and political movements; emphasis on investigation of persuasive discourse; examination of the nonverbal symbols of persuasion.

COM 331 The Rhetorical Tradition in Western Thought (5) I&S/VLPA Analysis of the major

theories that prescribe and describe the use of symbols to change attitudes and behavior. Principal emphasis is placed upon defining the nature and scope of rhetoric and upon analyzing the art's underlying assumptions about human beings as symbol users. Some background in history, philosophy, and literature is desirable.

COM 334 Essentials of Argument (5) I&S/VLPA Argument as a technique in the investigation of social problems; evidence, proof, refutation, persuasion; training in argumentative speaking.

COM 340 History of Mass Communication (5) I&S History and development of communication from prehistoric times; rise of mass media; political and economic context of newspapers, radio, film, and television.

COM 342 Media Structure (5) I&S Industrial organization and culture; consumer and producer decisions; public policy toward media; workforce and unions. Media role in culture and political economy.

COM 343 Effects of Mass Communication (5) I&S Effects of mass communication on individuals and society. Relevant theories applied to research evidence, addressing such topics as effects of stereotypes, violent and sexual imagery, and persuasive messages on our knowledge, attitudes, and behaviors.

COM 359 Writing for Mass Media (5) I&S Training in gathering information through interviews and observation and from written record and other public sources. Practice in organizing and writing this information for presentation in a mass medium such as a newspaper, newsletter, or magazine. Offered: AWSpS.

COM 360 Beginning Newswriting and Reporting (4) I&S Introduction to newswriting and reporting for print media. Focus on defining news, general writing skills, constructing leads, preparing a variety of basic journalism news stories, interviewing techniques, covering beats, and journalistic style.

COM 361 Advanced Reporting and Newswriting (4) I&S In-depth training in the development of advanced-level reporting and newswriting skills. Practice in information gathering, interviewing, use of sources, database analysis, and investigative reporting techniques. Recommended: COM 360.

COM 362 Community Journalism: News Lab (5) I&S Newswriting-skills course. Students gain real-world experience by producing news and feature stories for client papers in the Puget Sound Region. Involves considerable one-on-one work with the lecturer/editor. Requires writing and reporting skills. Recommended: COM 361.

COM 373 Communication in Small Groups (5) I&S/VLPA Discussion as an everyday community activity, with emphasis on the informal cooperative decision-making methods of committee, conference, and roundtable groups.

COM 374 Perspectives on Language (5) I&S/VLPA Study of language and meaning, and survey of several influential modern approaches, including the semantic, general semantic, behavioral, and analytic philosophical. Relates theories of language and meaning to the study of speech communication.

COM 375 Communication Ethics (5) I&S/VLPA Ethical problems in interpersonal and public speech communication. Alternative ways of evaluating and responding to moral problems in a variety of communication situations.

COM 376 Nonverbal Communication (5) I&S/VLPA Reviews the nature of nonverbal communication as part of the human message system. Discusses research on the types of cues that are part of the nonverbal system, reviews some communicative functions allowed by nonverbal cues (e.g., emotional expressions, relational messages, deception, coordination, or interaction), and ties nonverbal communication to language.

COM 378 Social Approaches to Interpersonal Communication (5) I&S/VLPA Exploration of several social approaches to interpersonal communication, emphasizing the theorists' philosophical orientations and practical applications.

COM 382 Social Scientific Approaches to Communication Research (5) I&S Comprehensive introduction to research methods employed in basic and applied communication research, including sample surveys, content analysis, experimentation, and elementary statistics.

COM 395 Communication Internship (2-5, max. 5) Faculty-supervised study of communication principles in internship contexts. Readings to aid students in observations of communication concepts combined with individualized reading structured around topics of interest for each student.

COM 401 Telecommunication Policy and Convergent Media (5) I&S Examines contemporary media and telecommunications industries since 1980 and their accelerating convergence. Attention given to economic, policy, and mass use issues. Review of major industry leaders, promising technologies, and new services. Social issues, government initiatives, and new legislation covered for both North American and international markets. Recommended: COM 301.

COM 402 New Media as Virtual Communities (5) I&S Technologically-mediated virtual communities considered through analysis of historical precedents and influences and through an exploration of the concept of community. Issues include a focus on social interactions; the social, political, economic, and technological contexts of virtual communities and the limits for their sustenance.

COM 405 New Media Criticism (5) I&S/VLPA Examines critically the content of new media forms, contrasting them with traditional media. Stresses influences of social, economic, political, and technological forces on content and developing strategies for critical analysis.

COM 406 Public Discourse on the Internet (5) I&S/VLPA Study of public advocacy and persuasion in internet environments, including public interest advocacy sites, political campaigns, advertisements, editorials, and essays. Various critical models applied to analyze narratives, style, argument structure, and credibility of internet discourse. Recommended: COM 331, COM 435, or COM 436.

COM 407 Communication Technology and Politics (5) I&S Employs some core concepts of political communication and theories of democracy to examine the emerging role of information and communication technologies in

candidate and issue campaigning; online voting; protest and advocacy movements; law-making and electronic governance in the United States and internationally. Offered: jointly with POL S 451.

COM 411 Political Communication Seminar (5, max. 10) I&S Contemporary topics studying how communication affects citizen engagement with public life. Offered: jointly with POL S 454.

COM 414 Mass Media and Public Opinion (5) I&S Examines the foundations of the idea of public opinion in a democratic environment and the role of mass communication in the organization, implementation, and control of that opinion. Considers these relationships from the perspectives of societal elites, media, and citizens. Offered: jointly with POL S 452.

COM 417 Political Deliberation (5) I&S Exploration of philosophical and empirical writings on political deliberation in small groups, campaigns, and other public settings. Contemporary deliberative theory. Participation in face-to-face discussions on current issues. Recommended: either COM 273 or COM 373. Offered jointly with POL S 455.

COM 418 Communications and the Environment (5) I&S Examines the role of mass media in the resolution of environmental problems. Topics include strengths and weaknesses of media coverage, use of media by environmental groups and government agencies, media effects on public opinion, and mass communication and social movements. Offered: jointly with ENVIR 418.

COM 420 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with SIS 419/POL S 468.

COM 423 Communication and Social Change (5) I&S Examines both theory and application involved in using communications media as a tool for addressing political, social, and economic development issues. Utilizes a case study approach to look at localized applications of traditional and new communications tools in the pursuit of sustainable development.

COM 425 European Media Systems (5) I&S Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contemporary economic, social, political, and cultural milieu in which they operate. Offered: jointly with EURO 425.

COM 426 International Media Images (5) I&S Ways in which media construct images of international peoples and events. Develops a set of critical tools for assessing media portrayals of international affairs and cultures.

COM 427 International Communications Law and Policy (5) I&S Examines the international and comparative aspects of traditional press law, broadcast regulation, and telecommunications policy. Also examines freedom of the press in international reporting and the efforts of countries to limit foreign media influences within their borders.

COM 428 Asian Media Systems (5) I&S Examines the media systems and communication policies in selected Asian countries. Identifies and analyzes the cultural, economic, historical, and political parameters that influence these media.

COM 429 Chinese Communications Systems (5) I&S Analyzes the economic, historical, intellectual, social, and political foundations of communications systems in the region of Chinese Asia: China, Hong Kong, Singapore, and Taiwan. Focus primarily on print and broadcast journalism.

COM 430 Canadian Documentary Film Traditions (5) I&S/VLPA History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with SISCA 430.

COM 431 Rhetorical Criticism (5) I&S/VLPA Study of approaches to rhetorical inquiry that aid in the description, analysis, interpretation, and evaluation of discourse. Applies various critical models to a chosen artifact.

COM 433 Speech Composition (5) I&S/VLPA Preparation and delivery of public speeches with emphasis on style, thought organization, and proof. Analysis of model speeches. Recommended: SP COM 220.

COM 434 Argumentation Theory (5) I&S/VLPA Theory and research on the structure and properties of argument, argument fields, argument modeling, the influence of audience, argument criticism, and related topics. Prerequisite: either COM 220 or COM 334.

COM 435 Historic American Public Discourse (5) I&S/VLPA Rhetorical criticism of historical public speeches, essays, and declarations. Includes readings of public texts in their historical and political context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers the beginnings of the nation to the middle of the 20th century.

COM 436 Contemporary American Public Discourse (5) I&S/VLPA Rhetorical criticism of contemporary public messages. Includes reading of public texts in their context to increase understanding of those texts, their rhetorical construction, and the culture from which they arose. Covers mid-20th century to the present.

COM 437 Rhetorical Perspectives in Intellectual Revolutions (5) I&S/VLPA Rhetorical investigation of selected major writings. Examines the rhetorical dimension in the progress of ideas through analysis of documents of major intellectual revolutions as persuasive works. Relates principal revolutions in Western thought to contemporary controversy. Examines Rights of Man, Communist Manifesto, The Origin of Species.

COM 440 Mass Media Law (5) I&S Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to

press coverage of the judicial system. Offered: jointly with POL S 461.

COM 441 United States Media History (5) I&S Development of mass communication in the United States with emphasis on role of mass media in politics, economics, gender, and race.

COM 442 History of Media Technology and Regulation (5) I&S Impact of pre-1980s media technologies — printing, telecommunications, broadcasting, photography, and more — on individuals and institutions, especially government, business, and the mass media. How laws and policies have changed to govern new media forms.

COM 443 Indigenous Film, Sovereign Visions (5) VLPA/I&S *Cote', Hart, Ross* Explores fiction, documentary, experimental film, and digital media from indigenous artists from around the world. Focuses on personal, political, and cultural expression. Issues include media and sovereignty movements, political economy, language revitalization, the politics of decolonization, and indigenous aesthetics. Offered jointly with AIS 443.

COM 444 Public Relations and Society (5) I&S Overview of issues, strategies, and role of public relations professionals in various areas of American society, including media relations, government relations, community affairs, and consumer relations.

COM 445 Journalism and Literature (5) I&S/VLPA Explores the relationship between journalism and fiction writing in the United States. Examines writers who began their careers as journalists and forged a fiction-writing philosophy related to what they learned in journalism. Readings in fiction and journalism.

COM 451 Mass Media and Culture (5) I&S/VLPA Empirical and theoretical framework for analyzing role of mass media in cultural change. Historical and contemporary cases consider ethnic, gender, class, and urban-rural conflicts and cultural roles of sports, elections, and national rituals. Focus on visual electronic media.

COM 452 Crisis Communications (5) I&S Study of the functions of communications professionals during crises. Covers public relations professionals as advocates for organizations and companies in crisis and the news media as advocates of the mass public. Discussion of cases.

COM 460 Special Reporting Topics (4, max. 8) I&S Topics vary. x.

COM 461 Computer-Assisted Journalism (5) I&S Introduction to computer-assisted journalism and other advanced reporting techniques. Includes hands-on electronic data analysis, exploration of on-line investigative tools, and the fashioning of electronically-retrieved information into news stories. Students examine ethical and technical challenges these tools present to media and society.

COM 463 Copy Editing and Design (5) I&S Focus on editing copy for publications, covering grammar and style, production methods, news criteria, use of wire services, headlines, make-up and design, pagination, and online publication.

COM 464 Opinion Writing (5) VLPA Combines the teaching expertise of a Department of Communication faculty member with the

professional expertise of an opinion-writing journalist. Students learn about and practice writing newspaper editorials, columns, and various forms of criticism in order to gain an understanding of the differences between news and opinion content in print journalism. Prerequisite: com 361.

COM 465 Legislative Reporting (12) I&S
Coverage of Washington legislature for a daily newspaper. Selected students live in Olympia, interview legislative delegations, report on committee and floor sessions, and attend and report on gubernatorial and other press conferences.

COM 466 Digital Journalism (5) I&S *A. Chan*
Introduction to digital journalism. Integrates Web design, video, still, and sound to develop an Internet Webcast called DIA (Digital Interactive) News. Students serve as sole initiator of DIA news, utilizing journalistic standard of storytelling, video production, and editing and design. Prerequisite: COM 300.

COM 467 Feature Writing (5) VLPA Focuses on the many types of newspaper and magazine articles that do not fall into the category of hard news, including histories and backgrounders, how-to and explanatory, consumer information, statistical pieces, first-person, and participatory. Includes practice in writing these forms. How to market freelance manuscripts.

COM 468 Journalism Ethics (5) I&S *Simpson*
Provides a method and substantive context based on ethical theory, media history, and value systems analysis for analyzing and resolving dilemmas raised by journalistic practices.

COM 469 Intellectual Foundations of American Journalism (5) I&S Examines the thinkers and philosophers who have influenced modern journalism. Studies the main ideas in the development of world thought and their impact on today's journalists. Explores the role communication systems have played in the creation of the world's cultures.

COM 470 Discourse: Analyzing Talk and Texts (5) I&S/VLPA From gossip to globalization, a critical and practical introduction to contemporary theories/methods in the study of discourse: how verbal communication is used in conversational talk and mediated texts to construct identities and relationships; and how power, control, and ideology are reproduced through language used in everyday social interactions.

COM 471 Persuasion (5) I&S/VLPA Analysis of the ways in which beliefs, values, attitudes, and behavior are deliberately influenced through communication.

COM 472 Empirical Approaches to Interpersonal Communication (5) I&S Examination of theories and research on the development and deterioration of interpersonal relationships. Emphasis on the nature of interpersonal interaction, the role of language and nonverbal communication in relationships, functional and dysfunctional interaction patterns, and the dynamics of interpersonal networks.

COM 473 Problems of Discussion Leadership (3) I&S/VLPA Critical analysis of leadership in committee and conference, with emphasis on the development of speech effectiveness in the cooperative achievement of goals. Prerequisite: COM 373.

COM 474 Communication, Conflict, and Cooperation (5) I&S/VLPA Role of communication in resolving informal conflicts and in facilitating interpersonal and intergroup cooperation. Review of empirical literature. In-class simulations and exercises.

COM 475 Organizational Communication (5) I&S/VLPA Role of communication in organizations, the types of problems arising, and approaches to their resolution. Communication in the human relations and productivity of organizations. Applying communication skills in various organization roles.

COM 476 Models and Theories in Communication (5) I&S Examination of selected theories and models of speech communication as well as of criteria applicable to them. Emphasis on the nature and function of theories and models, especially as these relate to basic principles underlying the scientific, interpretive, and critical study of speech communication phenomena.

COM 478 Intercultural Communication (5) I&S Investigates intercultural communication theory and its application for varying levels of human interaction: interpersonal, intergroup, and international.

COM 479 Communication in Children's Environments (5) I&S/VLPA Study of the communication capacity of children with emphasis on the analysis of the communication process in formal and informal learning environments. Includes examination of communication-based educational approaches and instructional strategies.

COM 480 Communication in Adolescent Environments (5) I&S/VLPA Study of the communication process in youth environments with a primary focus on formal and informal learning. Includes critical analysis of communication in contemporary instructional settings and the development of communication strategies for teaching and learning.

COM 482 Computer-Mediated Interpersonal Communication (5) I&S Examination of relationships and groups formed through computer-mediated interpersonal communication. Focus on how people manage interactions and identities, develop interpersonal relationships, engage in collaboration and conflict, and develop communities in virtual environments. Involves both the study and use of network-based computer-mediated systems.

COM 484 Cultural Codes in Communication (5) I&S/VLPA Social and cultural codes in interpersonal communication, with special reference to contemporary American subcultural groups and their communication patterns.

COM 485 Fieldwork in Communication Studies (5) I&S/VLPA Theory and practice of participant observation, intensive interviewing, and discourse analysis in the study of communicative practices. Prerequisite: COM 484.

COM 488 Race, Gender, and Power in Asian American Media (5) I&S Examines the cultural, political, and social facets of Asian American media since 1915 within such key issues as racial and sexist stereotypes, white privilege and hegemony, identity, and agency and empowerment. Informed by critical theories of race and ethnicity.

COM 489 Ethnicity, Gender, and Media (5) I&S
Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with AES 489/WOMEN 489.

COM 495 Special Topics in Communication (2-5, max. 15) Lecture, seminar, and/or team study. Topics vary.

COM 496 Honors Seminar (5) I&S/VLPA
Preparation for researching and writing senior honors thesis.

COM 497 Honors Thesis (5, max. 15) I&S/VLPA Researching and writing honors thesis.

COM 498 Independent Research (1-5, max. 10)
Work on research projects designed and conducted by undergraduate students.

COM 499 Directed Research (1-5, max. 10)
Work on research projects designed by faculty members.

COM 500 Communication Theory Development (5) Covers the philosophy behind theory development, discusses the basic components of theories, and reviews significant theoretical contributions in communication from social scientific and humanistic traditions. Introduces students to the process of conceptualization and theory design through reading and discussion of relevant bodies of communication scholarship.

COM 501 Methods of Inquiry (5) Overviews some of the most important methods of inquiry used to investigate communication phenomena. Includes textual criticism, content analysis, ethnography, experimentation, survey research, and historical approaches. Explores the utility of different methods for investigating research topics, defining and measuring concepts, reading texts, and investigating theories.

COM 502 Communication Scholarship and Public Life (5) Examines potential connections between communication scholarship and government, markets, civil society, and the general public.

COM 507 Interdisciplinary Communication Theory (5) Introduces students to challenges, benefits, and processes of interdisciplinary research. Explores formation of disciplinary boundaries. Considers significant theories that have influenced communication research. Considers how synthetic theoretical arguments are made and how to integrate work from fields with different epistemologies.

COM 509 Collaboration and Scholarship (5) Examines the collaborative research process. Students identify and conceptualize a group project, carry it out, and present findings. Topic varies. Prerequisite: COM 501 or equivalent.

COM 511 Content Analysis (5) Content analysis as a technique for making inferences from texts. Includes quantitative, qualitative, and computer-assisted approaches to analysis.

COM 512 Critical, Social, and Practice-Based Approaches (5) Explores approaches to communication research developed from understandings of human communication as inherently social, grounded in tool-mediated action, and interwoven with power relations. Covers a range of theories that are associated with these approaches, and the implications of these theories for methods of data collection and analysis.

COM 513 Fieldwork Research Methods (5-, max. 10) Methods of fieldwork research in communication studies, with emphasis on participant observation, ethnography, and discourse analysis.

COM 515 Rhetorical Criticism (5) History and method of rhetorical criticism. Application of critical standards to various rhetorical artifacts.

COM 516 Descriptive and Analytic Communication Research Methods (5) Development of the historical approach to communications research. Study of historical methods, bibliography, and criticism.

COM 517 Survey Research (5) Faculty-directed project in survey research in which basic principles of survey design, including sampling, observation, measurement, data analysis, and data interpretation, are all applied. Prerequisite: elementary statistics or permission of instructor.

COM 520 Statistical Methods in Communication (5) Reviews the steps taken in social scientific research on communication, with emphasis on the conceptualization, operationalization, and analysis of quantifiable variables. Highlights understanding of computer application of univariate and bivariate statistics, focusing on both parametric and nonparametric tests.

COM 521 Advanced Statistical Methods in Communication (4) Discusses complexities in quantitative research on communication. Focus on multivariate data design and analysis, including multiple and logistic regression, ANOVA and MANOVA, and factor analysis. Prerequisite: COM 520.

COM 527 International Communication Research Methods (5) Methodological issues particular to the design or analysis of research that deals with data from different countries, cultures, or sub-cultures. Prerequisite: COM 501 or equivalent.

COM 528 Designing Internet Research (5) Focuses on designing Internet research, assessing the adaptation of proven methods to Internet tools and environments, and developing new methods in view of particular capacities and characteristics of Internet applications. Legal and ethical aspects of Internet research receive ongoing consideration.

COM 529 Research Strategies and Methodologies in Digital Media (5) Introduces and compares methods of inquiry into digital media industries, practitioners, and consumers. Develops theories and skills applicable in business decision-making processes, as well as in scholarly research.

COM 530 Philosophical Issues in Rhetorical and Communication Theory (5) Survey of selected philosophical controversies among speech communication theorists, and analysis of one philosopher's approach to communication. Topics include paradigm descriptions of communication, rhetoric and knowledge, linguistic analysis and communication, hermeneutics and dialogue.

COM 531 Rhetoric in Society (5) Selected works of major rhetorical theorists such as Aristotle, Cicero, Augustine, Campbell, Whately, Perelman, and Burke. Examines how rhetorical themes are responsive to and symptomatic of societal conditions and values.

COM 532 Classical Rhetoric (5) Development of the classical tradition in rhetorical theory, criticism, and pedagogy from the sophists to Augustine; analysis of the contributions of major figures and works to that tradition.

COM 534 Studies in Contemporary Rhetoric (5) Critical analysis of theories of twentieth-century rhetoric.

COM 535 Critical Theory Applications in Communication (5) Major approaches in critical theory: Marxism, psychoanalysis, structuralism, and semiology. Synthesizes these approaches by viewing the "cultural studies" tradition. Assesses critical theory through empirical study of network television in the United States and the United Kingdom.

COM 538 Theories and Criticism of Communication Technologies (5) Potential of the computer for use in behavioral science. Prerequisite: elementary programming, elementary statistics.

COM 540 The Rhetoric of Science (5) Examines selected topics in the rhetoric of science, underscoring the interplay of language, situation, culture, and prior tradition in the quest for exact knowledge of the natural world. Scrutinizes scientific communication in intradisciplinary, interdisciplinary, and extradisciplinary contexts.

COM 542 Readings in Communication History (5) Selected readings on the history of communication.

COM 543 Research Seminar in Historic and Contemporary Communication (5) Topical research seminar in historic and contemporary communication.

COM 545 Development of Mass Communication (5) Institutions of mass communication. Political and social roles.

COM 546 Evolution and Trends in Digital Media (5) Examines the past, present, and future of digital communication from diverse disciplinary and theoretical perspectives. Offered: A.

COM 547 Telecommunications Policy and Convergent Media (5) Structures and policies governing the functioning of communication technologies and data flow: United States and international perspectives. Interdisciplinary approach.

COM 549 Mass Communication Process and Effects (5) Analytic approach to conceptualization and research in the field since 1900.

COM 550 European Union Information Society Policy (5) *Giffard* Analysis of European Union policy and regulatory documents relating to cultural, economic, political, social, and technological aspect of the new information society, including efforts to promote transborder flows of television programs in Europe.

COM 551 Political Communication (5) Surveys classic works and new directions in political communication, including functionalist, structuralist, constructivist, network, and comparative approaches, reflecting a range of methods. Examines political organizing, electoral and legislative processes, civic (dis)engagement, media and politics, public deliberation and

opinion formation, political identity and discourse. Offered: jointly with POL S 551.

COM 553 Public Opinion and Communication (5) Conceptual and methodological approaches to public opinion and communication as historical and behavioral phenomena. United States and international perspectives.

COM 554 Discourse and the Politics of Resistance (5) Examines how disciplines theorize and empirically study discourse in the politics of resistance. Examines the discursive turn in U.S. and European "new" social movement theory. Ranges across disciplines, such as political sociology, cultural anthropology and human geography, to discover ways in which discourse is conceptualized and studied for its role in seeding social change. Offered: jointly with POL S 567.

COM 555 Political Deliberation (5) VLPA I&S *Gastil* Exploration of deliberative theories of democracy and research on political discussion in campaigns, face-to-face meetings, on-line forums, and informal conversations. Presents different uses and understandings of deliberation and its role in democratic governance. Recommended: COM 577, POL S 551/COM 551. Offered jointly with POL S 558.

COM 556 Political Communication Research Practicum: Community, Communication, and Civic Engagement (5) Overview of the research process, including literature review, hypothesis generation, data gathering, empirical analysis, and writing for publication. Topics vary with instructor, but generally address questions of how communication affects democracy and citizen engagement in national or international contests. Offered: jointly with POL S 594.

COM 557 Government and Mass Communication (5) Legal problems of mass communication, institutions, and media operations.

COM 558 U. S. Digital Media Law and Policy (5) Examines the conceptual framework and social application of existing regulations and policies on digital media, with the aim of helping professionals address the changing legal and policy environments.

COM 559 Media and Foreign Policy (5) The role of communications media in how nations interact. The media as source, actor, and catalyst in international affairs. Interdisciplinary focus.

COM 561 Regional Communication Systems (5) Communication as a factor in economic, sociocultural, and political relations among nations of a region. Focus varies with specialization of instructor. Consult graduate secretary for details. Interdisciplinary focus.

COM 562 International Communication Systems (5) International communications and contemporary issues that affect the functioning of global communication systems. Interdisciplinary focus.

COM 564 Media, Myth, and Ritual (5) *Douglas* Examines the way media operate in a secular society with many of the characteristics that traditionally have been imputed to spirituality and religion. Analyzes media's mythological and ritualistic function in society by taking an interdisciplinary approach informed by religious studies, cultural studies, journalism, and communication theory.

COM 565 Mass Media Structure (5) Research on the structural aspects of mass communication.

COM 566 Discourse and Sexuality (5) Seminar-based analysis of discourse and social construction of eroticism/desire in face-to-face/mediatized talk and texts; examination of the reproduction of power, control and ideology through the linguistic and semiotic realization of sex/uality. Offered: jointly with WOMEN 566.

COM 567 Gender, Race, and Communication (5) Analysis of the role of media in the construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with WOMEN 589.

COM 570 Organizational Communication (5) Examination of social scientific theory and research on communication in organizations. Topics include quantitative and qualitative approaches to process of organizational communication, function and structure of macro networks, superior-subordinate relationships, and the role of communication in organizational change, development, and effectiveness.

COM 576 Interpersonal Communication (5) Social scientific research and theory on the role of communication in developing and maintaining interpersonal relationships. Nature of interpersonal communication, relationship change processes, interpersonal control through communication, and personal communication networks.

COM 577 Communication in Small Groups (5) Reviews major small group communication theories and the history of research on small groups. Topics include structuration, democratic decision making, symbolic convergence, and the influence of personality, gender, and ethnicity on group communication. Involves students in original research projects on communication in small group settings.

COM 578 Intercultural Communications (5) *Manusov, Rivenburgh* Focuses on the nature of communication between different cultures, including the processes as they occur on sojourns, immigration, negotiations, and conversations across national boundaries. Specific topics include identity formation and expression, intercultural relationships, stereotyping, prejudice, and group affiliation.

COM 580 Nonverbal Communication (5) Reviews primary theories and research on nonverbal communication. Focus on developmental and social aspects of nonverbal cues, including review of communicative functions served by nonverbal channels. Topics include paralinguistic systems, relational messages, deception, acquisition of cue use, and emotional expression. Emphasizes research methods and influences of culture and context.

COM 582 Communication Education Research (5) Communication in instructional environments. Nature of instructional communication, paradigms for instructional communication research, quantitative and qualitative approaches to instructional communication, verbal and nonverbal classroom interaction.

COM 584 Ways of Speaking (5) Theory and literature of the ethnography of communication, with special emphasis on the descriptive-comparative approach to culturally patterned

styles of communicative conduct. Offered: jointly with ANTH 584.

COM 585 Digital Media Message Design and Content Creation (5) Applies communication theory to the identification, creation, and evaluation of digital media message design to meet needs of the target audience. Introduces the theory and practice of hypertext and project management techniques needed to organize digital assets, allocate resources, and meet deadlines.

COM 586 Writing and Presentation for Digital Media (5) Applies communication theory and research tools to rhetorical and design choices in web page creation. Examines the emergence of digital media story-telling techniques, as well as ethical and technical challenges these tools present to media and society.

COM 587 Digital Media Economics and Management (5) Emphasizes communication theory to analyze effective management of digital media enterprises, with practical application of economic theory to entrepreneurial strategies. Topics include analysis of the total business process, patterns of ownership, merger and acquisitions, finance and accounting, human resources development, sales and marketing, and ethics.

COM 588 Digital Media Branding and Marketing (5) Critically examines the role of advertising, marketing, and other promotional efforts in establishing the branding of digital media companies. By using communication theory to analyze successful cases of established and start-up digital media companies, participants identify practicable and effective strategies for brand building and enhancement.

COM 589 Global Digital Media Law, Policy, and Ethics (5) Examines the legal, social, political, and policy environments of digital media laws, policies and ethics around the world. Offers a comparative perspective, which prepares digital media managers to expand into other markets outside their home bases.

COM 590 Selected Readings (1-5, max. 10) Selected readings assigned by faculty.

COM 591 Independent Research (1-5, max. 10) Research projects designed and led by students with faculty supervision.

COM 592 Directed Research (1-5, max. 10) Student participation in faculty-directed research projects.

COM 593 Communication Internship (1-5, max 15) Provides students an opportunity to connect their scholarship with communities outside academia by engaging in a project that uses communication theory to inform practical work.

COM 594 Professional Proseminar (1, max. 6) Helps students develop a range of professional competencies. Focuses on a particular topic such as computer-assisted research, technology in the classroom, obtaining funding for research, writing for academic publication, career choices after graduate school, and ethics in research and teaching.

COM 595 Public Speaking Pedagogy (1, max. 5) Content and effective teaching skills for public speaking course. Emphasizes the rhetorical tradition, grading speeches, and facilitating oral critiques. Required for all COM 220 TAs;

recommended for those who want to teach COM 220. Only 3 credits count toward degree. Credit/no credit only.

COM 596 Communication Pedagogy (1, max. 3) Development of effective teaching and professional skills. Emphasizes interactive teaching, leading discussions, lecturing, planning courses, evaluating resource materials, grading and evaluation, teaching philosophies, and effective classroom management and communications. Required of all graduate students who accept teaching assistantships. Credit/no credit only.

COM 597 Special Topics in Communication (5, max. 10) Examination of current topics in the theory and practice of political communication. Offered: jointly with POL S 552.

COM 600 Independent Study or Research Project (*) Prerequisite: permission of supervisory committee chairperson. Credit/no credit only.

COM 700 Master's Thesis (*) .

COM 800 Doctoral Dissertation (*) .

Comparative History of Ideas

CHID 110 The Question of Human Nature (5) I&S/VLPA *Clowes, Merrell* Considers the relationship between the individual and his/her culture. Traces the evolution of the notion of human nature in Europe and the United States and compares this tradition with representations of the human being from other cultural traditions.

CHID 205 Method, Imagination, and Inquiry (5) VLPA *Searle* Examines ideas of method and imagination in a variety of texts, in literature, philosophy, and science. Particularly concerned with intellectual backgrounds and methods of inquiry that have shaped modern Western literature. Offered: jointly with ENGL 205.

CHID 207 Introduction to Intellectual History (5) I&S *Clowes, Toews* Ideas in historical context. Comparative and developmental analysis of Western conceptions of "community," from Plato to Freud. Offered: jointly with HIST 207.

CHID 210 The Idea of the University: Ways of Learning, Exploring, and Knowing (5) I&S Considers different ways of learning, exploring, and knowing in the context of the historical development, social context, and impact of universities in general and of the University of Washington in particular. Includes reflective workshops on choosing areas of study (majors) in collaboration with Undergraduate Advising.

CHID 270 Special Topics (5, max. 15) I&S Each special topics course examines a different subject or problem from a comparative framework.

CHID 298 Pre-Departure Seminars (2) I&S *Barrett, Pitchford, Warren* Prepares students to participate in CHID International Programs. Prerequisite: students must be accepted to an International Program prior to registration. Offered: AWSpS.

CHID 300 Ideas in Art (5) VLPA *Opperman* Selected monuments of art and architecture in the Western tradition, from the Greeks to the

twentieth century, studied in relation to the intellectual background of the ages and civilizations that produced them. Slide lectures accompanied by discussion of assigned readings in philosophical, religious, scientific, political, literary, and artistic texts. Offered: jointly with ART H 300.

CHID 309 Marx and Nietzsche: The Assault on Bourgeois-Christian Civilization (5) I&S Major dilemmas and conflicts of modern Western consciousness through historical analysis of Marx, Nietzsche, and the movements they spawned. Emphasis on the relationship between sociocultural change, biography, and ideological innovation. Offered: jointly with HIST 309.

CHID 314 The Psychoanalytic Revolution in Historical Perspective (5) I&S Genesis and evolution of Freudian theory in context of the crisis of liberal-bourgeois culture in central Europe and parallel developments in philosophy, literature, and social theory. Emergence and division of the psychoanalytic movement. Transformation of psychoanalysis in British, French, and especially American cultural traditions. Offered: jointly with HIST 314.

CHID 332 Disability and Society: Introduction to Disability Studies (5) I&S Introduction to the field of disability studies. Focuses on theoretical questions of how society predominantly understands disability and the social justice consequences. Examines biological, social, cultural, political, and economic determinants in social creation/construction (framing) of disability and effects on those claiming and/or labeled as disabled. Offered: jointly with LSJ 332.

CHID 350 Women in Law and Literature (5) I&S/VLPA *Tupper* Representations of women in American law and literature. Considers how women's political status and social roles have influenced legal and literary accounts of their behavior. Examines how legal cases and issues involving women are represented in literary texts and also how law can influence literary expression. Offered: jointly with WOMEN 350.

CHID 370 The Cultural Impact of Information Technology (5) I&S/VLPA Utilizing approaches from the history of technology, cultural studies, and literary theory, seeks to analyze the cultural and social impact of information technology. Considers how information technologies impact our relationships with others, our concept(s) of self, and the structure of the communities to which we belong. Offered: jointly with COM 302.

CHID 380 The Nature of Religion and its Study (5) I&S *Jaffee, Webb* Study of religion as a general human phenomenon. Manner in which different methods of inquiry (phenomenology, anthropology, sociology, psychology, literary criticism, archaeology, philosophy, theology) illuminate different aspects of religion and shape our conceptions of its nature. Recommended: RELIG 201 or RELIG 202. Offered: jointly with RELIG 380.

CHID 390 Colloquium in the History of Ideas (5) I&S *Clowes, Toews, Tupper* Basic theoretical issues in the comparative history of ideas as a disciplined mode of inquiry; examination of representative historical figures and problems. Primarily for majors.

CHID 433 Disability Law, Policy, and the Community (5) Seminar addressing legal rights of disabled people, history of disability policy in the United States, and the role of community

activism and other forces in policy development and systems change. Introduction to the existing social service systems that affect disabled people. Recommended: LSJ 332. Offered: jointly with LSJ 433.

CHID 434 Civil and Human Rights Law for Disabled People (5) I&S Designed for students interested in expanding their knowledge of civil and human rights for disabled people. Examines the American perspective (ADA) as well as various international models including the United Nations' International Human Rights treaties as they relate to disabled people. Recommended: LSJ 332. Offered: jointly with LSJ 434; A.

CHID 470 CHID Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 471 Europe Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 472 Latin America Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 473 Africa Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 474 Asia Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 475 East Asia Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 476 South Pacific Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 477 Middle East Study Abroad (5, max. 15) I&S For participants in study-abroad program. Specific course content varies.

CHID 484 Colonial Encounters (5) I&S History of European colonialism, focusing on British, French, and Dutch colonial encounters from 1750s to 1950s. Units on colonial law, medicine, religion, sexuality, and commodity culture. Offered: jointly with HSTEU 484.

CHID 490 Research Seminar (5) VLPA/I&S *Thurtle, Toews* Intensive readings in specific topic. Students complete individual research projects. Satisfies the senior thesis requirement. Prerequisite: CHID 390.

CHID 491 Senior Thesis (5-) I&S Critical and methodological issues. Required of candidates for an honors degree.

CHID 492 Senior Thesis (-5-) I&S Critical and methodological issues. Required of candidates for an honors degree.

CHID 493 Senior Thesis (-5) I&S Research and writing of thesis under supervision of a faculty member. Required of candidates for an honors degree.

CHID 496 Focus Groups (1-2, max. 4) Credit/no credit only.

CHID 497 Peer Facilitators (5) .

CHID 498 Special Colloquia (1-5, max. 20) I&S Each colloquium examines a different subject or

problem from a comparative framework. A list of topics is available from the CHID office.

CHID 499 Undergraduate Independent Study or Research (1-5, max. 10) Supervised independent study for students who wish to pursue topics not available in regular course offerings.

Comparative Literature

C LIT 200 Introduction to Literature (3/5) VLPA Reading, understanding, and enjoying literature from various countries, in different forms of expression (e.g., dramatic, lyric, narrative, rhetorical) and of representative periods. Emphasis on the comparative study of themes and motifs common to many literatures of the world.

C LIT 210 Literature and Science (5, max. 15) VLPA Introduces the rich and complex relationship between science and literature from the seventeenth century to the present day. Students examine selected literary, scientific, and philosophical texts, considering ways in which literature and science can be viewed as forms of imaginative activity.

C LIT 211 Literature and Culture (5, max. 15) I&S/VLPA Study of literature in its relation to culture. Focuses on literature as a cultural institution, directly related to the construction of individual identity and the dissemination and critique of values.

C LIT 230 Introduction to Folklore Studies (5) I&S/VLPA Comprehensive overview of the field of folkloristics, focusing on verbal genres, customs, belief, and material culture. Particular attention to the issues of community, identity, and ethnicity. Offered: jointly with SCAND 230.

C LIT 240 Writing in Comparative Literature (5, max. 15) C Comparative approach to literature and a workshop in writing comparative papers in English. Emphasis on cross-cultural comparison of literary works. Readings in English with an option to read selected texts in the original languages Offered: AWP.

C LIT 270 Perspectives on Film: Introduction (5) VLPA Introduction to film form, style, and techniques. Examples from silent film and from contemporary film. 270, 271, 272 are designed to be taken as a sequence, but may be taken individually.

C LIT 271 Perspectives on Film: Great Directors (5) VLPA Introduction to authorship in the cinema. The work of a major director or directors. 270, 271, 272 are designed to be taken as a sequence, but may be taken individually.

C LIT 272 Perspectives on Film: Genre (5) VLPA Introduction to study of film genre. Literary, mythic, and historic aspects of film genre. 270, 271, 272 are designed to be taken as a sequence, but may be taken individually.

C LIT 300 Introduction to Comparative Literature: Forms, Genres, History (5) VLPA An introduction to comparative literary study designed for departmental majors. Examines how literary forms and genres shape our reading of texts; how these forms and genres change over time; and how literary forms and genres manifest themselves in different cultural traditions. Includes theoretical readings and substantial writing.

C LIT 301 Theory of Film: Analysis (5) VLPA Introduction to the analysis of film. Covers major aspects of cinematic form: mise en scene, framing and camera movement, editing, and sound and color. Considers how these elements are organized in traditional cinematic narrative and in alternative approaches.

C LIT 302 Theory of Film: Critical Concepts (5) VLPA Overview of the main conceptual problems in film criticism such as: "what is a film?", "what is the relationship between film and reality?", "does a film have a language?", "what is the connection between image and sound?" Follows a historical timeline within five individual sections.

C LIT 303 Theory of Film: Genre (5) VLPA Introduction to the history and significance of film genres from the early days of film to the present. Examines a selection of several genres, drawn from a list including western, melodrama, musical, thriller, road odyssey, film noir, and documentary. Topics include form, ideology, authority, history, innovation, and parody.

C LIT 310 History of Film: 1895-1929 (5) VLPA Film history from its beginnings in the 1890s through the golden era of silent film in the 1920s. Topics include the invention of major film techniques, the creation of Hollywood and the studios, and movements such as expressionism, constructivism, and surrealism.

C LIT 311 History of Film: 1930-1959 (5) VLPA Film history from the introduction of sound through the late 1950s. Focuses mostly on the golden age of the Hollywood studios and on alternative developments after World War II in Italy (Neo-Realism), France (the New Wave), and Japan.

C LIT 312 History of Film: 1960 - 1988 (5) VLPA Covers the vast changes in filmmaking since 1960. Topics include the continuing influence of the French New Wave, the New German Cinema of the 70s and the "New Hollywood" of the 70s, American independent film of the 80s, and the resurgence of Chinese filmmaking since 1980.

C LIT 313 History of Film: 1989-Present (5) VLPA Addresses the latest trends in international filmmaking typically with an emphasis on world cinema and issues of globalization and diaspora. Sometimes taught in conjunction with the Seattle International Film Festival.

C LIT 315 National Cinemas (3-5, max. 15) VLPA Examines the cinema of a particular national, ethnic or cultural group, with films typically shown in the original language with subtitles. Topics reflect themes and trends in the national cinema being studied. .

C LIT 320 Studies in European Literature (5, max. 15) VLPA Examination of the development of European literature in a variety of genres and periods. Possible areas of study include literature from romantic fiction of early nineteenth century through great realist classics of second half of the century or from symbolism to expressionism and existentialism.

C LIT 321 Studies in Literature of the Americas (5, max. 15) VLPA Emphasizes connections between twentieth century literature of the United States and Canada and current literature of Latin America. Emphasizes that, despite obvious differences, much is shared in terms of culture and national sensibility across the two continents.

C LIT 322 Studies in Asian and Western Literatures (5, max. 15) VLPA Topics designated by individual instructors.

C LIT 323 Studies in the Literature of Emerging Nations (5, max. 15) VLPA Novels and short stories, from Africa, the Middle East, and South Asia. Discusses relationship of Western literary genres to an oral literary tradition, as well as issues like colonialism, gender relations, narrative technique, native and non-native languages.

C LIT 330 The European Fairy Tale (5) VLPA An introduction to folktales and literary tales from various traditions and periods. A discussion of their origin, special characteristics, dissemination, and relevance to the contemporary reader.

C LIT 331 Folk Narrative (5) VLPA Survey of various genres of folk narratives studied in performance contexts to reveal their socio-cultural functions in a variety of milieu. Theory and history of folk narrative study, taxonomy, genre classification, and interpretative approaches. Recommended: SCAND 230 or C LIT 230. Offered: jointly with SCAND 331.

C LIT 334 Immigrant and Ethnic Folklore (5) I&S/VLPA Survey of verbal, customary, and material folk traditions in ethnic context. Theories of ethnic folklore research applied to the traditions of American communities of Scandinavian, Baltic, or other European ancestry. Recommended: SCAND 230 or C LIT 230. Offered: jointly with SCAND 334.

C LIT 350 Themes in World Literature: Parents and Children (5) VLPA World literature, from the Renaissance to modern times, based upon the theme of "parents and children." Selections drawn from European, English, and American literature, not limited to period and genre. Focus upon the motive of generational conflict.

C LIT 351 Themes in World Literature: Love, Sex, and Murder (5) VLPA World literature, from the Renaissance to modern times, based upon the theme of "love, sex, and murder." Selections drawn from European, English, and American literature, not limited to period and genre. Focus upon the human potential for both great violence and extraordinary compassion.

C LIT 352 Themes in World Literature: Death and Transfiguration (5) VLPA Theme of death, transfiguration, and new life in world literature. Selections from Tolstoy, D. H. Lawrence, Celine, E. M. Forster, and other major writers.

C LIT 357 Literature and Film (3-5, max. 10) VLPA The film as an art form, with particular reference to the literary dimension of film and to the interaction of literature with the other artistic media employed in the form. Films are shown as an integral part of the course. Content varies.

C LIT 371 Literature and the Visual Arts (5) VLPA Focuses on specific theoretical problems. Examines the relationship between text and image in a variety of art forms including poetry, novels, paintings, photography, essays, comic strips, film, and advertisement. Readings, in English, from a wide variety of national literatures.

C LIT 375 Images of Women in Literature (5, max. 15) VLPA Comparative study of the ways women's image, social role, and psychology have been portrayed by writers of various nationalities and literary periods. Selection of theme varies

from quarter to quarter. Works are read in English translation.

C LIT 396 Special Studies in Comparative Literature (3-5, max. 10) VLPA Offered by visitors or resident faculty. Content varies.

C LIT 397 Special Topics in Cinema Studies (3-5, max. 10) I&S/VLPA Varying topics relating to film in social contexts. Offered by resident or visiting faculty.

C LIT 400 Introduction to Theory and Criticism (5) VLPA A selection of major theoretical statements in the history of literary theory and criticism, with texts drawn from such fields as literary studies, aesthetic theory, film studies, philosophy, and cultural studies.

C LIT 410 Studies in Literary History (5, max. 15) VLPA Introduction to a major figure or movement associated with the development of literary history. Through the study of one aspect of literary history students gain a thorough understanding of a particular point of view, while exploring the breadth of contemporary approaches to literature.

C LIT 421 Studies in Connections: Literature and Other Disciplines (5, max. 15) VLPA Examines the links between literature and other disciplines or art forms. Literature and history, literature and philosophy, literature and music, literature and the visual arts are all appropriate topics. Selection of focus depends on instructor.

C LIT 422 Studies in Genre (5, max. 15) VLPA Major genres of world literature: poetry, fiction, drama. Readings, in English from a wide selection of national literatures.

C LIT 424 The Epic Tradition (5) VLPA Ancient and medieval epic and heroic poetry of Europe in English: the Iliad, Odyssey, and Aeneid; the Roland or a comparable work from the medieval oral tradition; pre-Greek forerunners, other Greco-Roman literary epics, and later medieval and Renaissance developments and adaptations of the genre. Choice of reading material varies. Literary background recommended. Offered: jointly with CLAS 424.

C LIT 430 Readings in Folklore (5) VLPA Exploration of theoretical and methodological issues in folklore studies through independent reading of journal articles published during the last five years. Recommended: SCAND 230 or C LIT 230. Offered: jointly with SCAND 430.

C LIT 431 The Northern European Ballad (5) VLPA Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with SCAND 431.

C LIT 490 Directed Study or Research (1-5, max. 10) Individual study of topics in comparative literature by arrangement with the instructor and the Comparative Literature office.

C LIT 491 Internship (1-5, max. 5) Supervised experience in local businesses and other agencies. Open to upper-division Comparative Literature and Cinema Studies majors. Recommended: 25 credits of C LIT courses.

C LIT 493 Comparative Literature Honors Seminar (5, max. 15) VLPA Special topics in comparative literature. Required of honors students in comparative literature.

C LIT 495 Honors Thesis (5) VLPA Preparation of an honors thesis under the direction and supervision of a faculty member.

C LIT 496 Special Studies in Comparative Literature (3-5, max. 15) VLPA Offered occasionally by visitors or resident faculty. Content varies.

C LIT 497 Special Topics in Cinema Studies (3-5, max. 15) VLPA Varying topics in Cinema Studies. Offered by resident or visiting faculty.

C LIT 500 The Theory of Literature I: The Literary Text (5, max. 15) An investigation into the nature of literature in contrast to other forms of writing and into essential features of literature such as genres, imagery, modes of communication, and structure.

C LIT 501 The Theory of Literature II: History of Literature (5, max. 15) An exploration of topics of literary history such as periods, traditions, the writing of literary history, and literary history in contrast to other histories.

C LIT 502 The Theory of Literature III: Special Topics (5, max. 15) Offerings vary to cover topics such as individual theorists, theoretical movements, or the intersection of literary theory with other disciplines or arts (psychoanalysis, structuralism, ethics, aesthetics).

C LIT 507 History of Literary Criticism and Theory I (5, max. 15) A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle, Longinus, and the major medieval critics. Offered: jointly with ENGL 507.

C LIT 508 History of Literary Criticism and Theory II (5, max. 15) Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with ENGL 508.

C LIT 509 History of Literary Criticism and Theory III (5, max. 15) Literary Criticism and theory from Kant's *Critique of Judgment* to the mid-twentieth century and the work of Northrop Frey. Offered: jointly with ENGL 509.

C LIT 510 History of Literary Criticism and Theory IV (5, max. 15) A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with ENGL 510.

C LIT 511 Literary Translation (5, max. 15) Lectures on principles of translating literary works into readable English. Students present and comment on translations made by them and write seminar papers on problems of translation in theory and practice.

C LIT 516 Colloquium in Criticism (5, max. 15) Recent trends in literary criticism, taught by representatives from various literature departments, covering critical trends such as structuralism, poststructuralism, hermeneutics, reception theory, and sociological approaches to literature.

C LIT 517 Colloquium in Folklore (5) Recent trends in folklore studies, taught by representatives from various literature departments and disciplines in the social sciences.

C LIT 518 Colloquium in Medieval Studies (5) Salient literary aspects of the European Middle Ages, taught by representatives from various

literature departments as well as from related disciplines, such as philosophy, art history, history, and comparative religion.

C LIT 530 Cultural Criticism and Ideology Critique I (5, max. 15) A study of the main attempts to come to an understanding of the humanities and the nature of historical interpretation in a cultural context.

C LIT 535 Cultural Criticism and Ideology Critique II (5, max. 15) Offerings vary to cover individual theorists and particular manifestations of cultural criticism and ideology critique.

C LIT 545 Medieval Studies (3/5, max. 15) Literature, intellectual history, and sociology of the Middle Ages, 500-1200. Topics may include "renaissance" of the twelfth century; the educational ideal; rise of universities; philosophical concepts.

C LIT 546 Studies in Renaissance and Baroque (3-5, max. 10) Aspects of Western European literature during the Renaissance and Baroque period. Course content varies.

C LIT 547 Studies in Eighteenth-Century Literature (3-5, max. 10) Examination of various trends in eighteenth-century literature including the Enlightenment, Rationalism, Pre-Romanticism, and Neo-Classicism. Course content varies with instructor.

C LIT 548 Studies in Nineteenth-Century Literature (3-5, max. 10) Examination of various trends in nineteenth century literature including Romanticism, Realism, Naturalism, and Symbolism.

C LIT 549 Twentieth-Century Literature (3-5, max. 10) Selected movements, schools, and trends of significance in twentieth-century literature of Europe and Americas. Symbolism, surrealism, dada, expressionism, neorealism, existentialism, nouveau roman, and absurd may be considered. Texts in English, French, and German figure most prominently, but Spanish, Italian, Russian, and other materials may be examined. Content and emphasis vary.

C LIT 570 The Novel: Theory and Practice (3-5, max. 15) Study of the novel as a genre, examining two or more novels of varying national literatures. Course content varies.

C LIT 571 The Lyric: Theory and Practice (3-5, max. 15) Examination of central questions in the study of the lyric genre as approached from an international point of view. Course content varies.

C LIT 572 The Epic: Theory and Practice (3-5, max. 15) Examination of epic literature as exemplified by selected works chosen from various cultures and periods (e.g., French and German medieval courtly epic, the epic in Renaissance and baroque Europe, traditions of the mock epic). Course content varies.

C LIT 573 The Drama: Theory and Practice (3-5, max. 15) Examination of various aspects of the drama as a major literary genre, as approached from international and multilingual points of view. Course content varies.

C LIT 576 Seminar in East-West Literary Relations (3-5, max. 15) Comparative investigation of literary topics requiring the study of both Eastern and Western documents. Explores parallels and contradictions between the two, in concepts, ideas, and specific topics. A

comparative paper on a chosen topic with qualified conclusions is required. Emphasis varies. Prerequisite: at least one East Asian language.

C LIT 590 Master of Arts Essay (5/10, max. 10) Research and writing project under the supervision of a faculty member.

C LIT 596 Special Studies in Comparative Literature (3-5, max. 15) Offered occasionally by visiting or resident faculty. Course content varies.

C LIT 599 Special Seminar or Conference (1-9, max. 30) Group seminars or individual conferences scheduled to meet special needs. Prerequisite: permission of graduate program adviser.

C LIT 600 Independent Study or Research (*) .

C LIT 700 Master's Thesis (*) .

C LIT 800 Doctoral Dissertation (*) .

Dance

DANCE 101 Introduction to Dance (5) VLPA Introduction to dance as an art form. Lectures in dance appreciation. Studio experience in ballet and modern dance techniques. Attendance required at outside events.

DANCE 102 Introduction to Dance (5, max. 10) VLPA Introduction to dance as an art form. Lectures in dance appreciation. Studio experience in ballet and modern dance techniques. Attendance required at outside events. Prerequisite: DANCE 101.

DANCE 103 Introduction to Dance (5, max. 10) VLPA Introduction to dance as an art form. Lectures in dance appreciation. Studio experience in ballet and modern dance techniques. Attendance required at outside events. Prerequisite: DANCE 102.

DANCE 104 Modern Technique (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas and expansion of movement vocabulary.

DANCE 105 Modern Technique (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas and expansion of movement vocabulary.

DANCE 106 Modern Technique (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas and expansion of movement vocabulary.

DANCE 107 Ballet Technique I (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas. Expansion of ballet vocabulary.

DANCE 108 Ballet Technique I (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas. Expansion of ballet vocabulary.

DANCE 109 Ballet Technique I (1-8, max. 8) VLPA Advanced beginning. Continued development of all beginning areas. Expansion of ballet vocabulary.

DANCE 110 Jazz Technique I (1-4, max. 4) VLPA Introduction to jazz technique. Dance performance attendance required.

DANCE 111 Jazz Technique I (1-4, max. 4)
VLPA Introduction to jazz technique. Dance performance attendance required.

DANCE 112 Jazz Technique I (1-4, max. 4)
VLPA Introduction to jazz technique. Dance performance attendance required.

DANCE 166 Dance Composition I (5) VLPA
Introduction to the principles of dance composition through improvisation.

DANCE 201 Ballet Technique II (1-8, max. 8)
VLPA Intermediate. Expansion of ballet vocabulary.

DANCE 202 Ballet Technique II (1-8, max. 8)
VLPA Intermediate. Expansion of ballet vocabulary.

DANCE 203 Ballet Technique II (1-8, max. 8)
VLPA Intermediate. Expansion of ballet vocabulary.

DANCE 204 Modern Dance Technique II (1-8, max. 8) VLPA Intermediate. Expansion of movement vocabulary.

DANCE 205 Modern Dance Technique II (1-8, max. 8) VLPA Intermediate. Expansion of movement vocabulary.

DANCE 206 Modern Dance Technique II (1-8, max. 8) VLPA Intermediate. Expansion of movement vocabulary.

DANCE 210 Jazz Technique II (1-4, max. 4)
VLPA Intermediate-level jazz technique. Continued development of beginning areas. Expansion of movement vocabulary. Dance performance attendance required.

DANCE 211 Jazz Technique II (1-4, max. 4)
VLPA Intermediate-level jazz technique. Continued development of beginning areas. Expansion of movement vocabulary. Dance performance attendance required.

DANCE 212 Jazz Technique II (1-4, max. 4)
VLPA Intermediate-level jazz technique. Continued development of beginning areas. Expansion of movement vocabulary. Dance performance attendance required.

DANCE 230 Alternative Movement Studies (3, max. 9) VLPA Introduction to an alternative approach to movement study. Topics vary.

DANCE 232 Intermediate Alternative Movement Studies (3) VLPA Study of an alternative approach to movement at the intermediate level. Topics vary.

DANCE 233 Advanced Alternative Movement Studies (3) VLPA Study of an alternative approach to movement at the intermediate level. Topics vary.

DANCE 234 World Dance and Culture (3, max. 9) I&S/VLPA Survey course presenting selected dance idioms as they relate to ethnicity in their performance, aesthetics, and history. May have studio component.

DANCE 242 Music in Relation to Dance (3) VLPA *Moore* Provides students with music skills necessary to the areas of dance pedagogy, performance, choreography, dance analysis/criticism, and production. Includes an introduction to music theory, compositional and rhythmic analysis, music for dance class, and training on music/sound editing equipment.

DANCE 250 The Creative Context (1-5, max. 8) I&S/VLPA *Cooper* Gateway course for dance major. Examines dance as a universal activity and expression of cultural identity. Offers a cross-cultural and historical view of a variety of theatrical, vernacular, and sacred dance forms, and investigates the myriad ways that dance functions across societies. Offered: A.

DANCE 266 Dance Composition II (3-5, max. 10) VLPA Dance composition in relation to music. Emphasis on solos and small groups. Prerequisite: DANCE 166. Offered: alternate years.

DANCE 270 Dance Performance Activities (1-3, max. 9) VLPA Performance in a dance or work on a crew for a dance production, either a studio showing or public performance, conducted under faculty supervision. Credit/no credit only.

DANCE 301 Ballet Technique III (1-8, max. 8) VLPA Advanced-intermediate level: continued development and expansion in all areas of technique.

DANCE 302 Ballet Technique III (1-8, max. 8) VLPA Advanced-intermediate level: continued development and expansion in all areas of technique.

DANCE 303 Ballet Technique III (1-8, max. 8) VLPA Advanced-intermediate level: continued development and expansion in all areas of technique.

DANCE 304 Modern Dance Technique III (1-8, max. 8) VLPA Intermediate-advanced. Dance sequences of greater complexity.

DANCE 305 Modern Dance Technique III (1-8, max. 8) VLPA Intermediate-advanced. Dance sequences of greater complexity.

DANCE 306 Modern Dance Technique III (1-8, max. 8) VLPA Intermediate-advanced. Dance sequences of greater complexity.

DANCE 344 Early Dance History (3-5, max. 5) I&S/VLPA *Cooper* Survey of ballet history. Offered: A.

DANCE 345 Late Dance History (3-5, max. 5) I&S/VLPA Survey of modern dance history.

DANCE 366 Dance Composition III (3-5, max. 10) VLPA Dance composition in relation to production. Emphasis on larger group works. Prerequisite: DANCE 166.

DANCE 371 Choreographic Workshop (2-5, max. 5) VLPA Performing experience for students in pieces choreographed by faculty members and guest choreographers.

DANCE 390 Dance Teaching Methodologies (3-5) VLPA Introduction to dance pedagogy, including educational theory, motor learning, and biomechanical principles and music as it relates to the teaching of dance.

DANCE 420 Dance Aesthetics (3) I&S/VLPA Philosophical investigation of the expressive elements of dance. Reading and discussion of the concepts of beauty, style, and aesthetic theory.

DANCE 480 Senior Seminar (3) VLPA Culminating project emphasizing a synthesis of experiences in the Dance Program with a focus on individual interests.

DANCE 490 Special Studies in Dance (1-3, max. 10) VLPA Special studies designed to address contemporary and historical concerns in the field of dance.

DANCE 493 Anatomy for Dance (3-5) NW/ VLPA *Simpson* Anatomy of the musculoskeletal system and its applications in dance movement.

DANCE 499 Undergraduate Independent Study (*, max. 6) .

DANCE 510 Chamber Dance Production (3, max. 9) Dance production in the university environment. Publicity, programming, budgeting. Rehearsal, rehearsal direction, and performance of Chamber Dance Company repertoire. Credit/no credit only.

DANCE 515 Dance Research Methods (3) Seminar in problem identification and definition, theory development, research design, data analysis, and interpretation. Examples of various types of dance research.

DANCE 520 Dance in Higher Education (3) Readings, discussion, and observation of teaching methods. Students assist faculty in the instruction of lower-level classes. Selected anatomical, historical, and aesthetic concepts as they relate to dance pedagogy. Development of a personal teaching style appropriate for university-level dance courses.

DANCE 521 Dance Administration (3) Readings and discussion relating to dance administration in college and professional settings. Topics include: curricular development, academic advising, budgetary procedures, personnel issues, and problems related to dance as a performing art within the university structure.

DANCE 530 Choreographer/Composer Collaboration (2, max. 6) Collaboration between choreographers and composers: models and creative workshop projects, in preparation for a concert of collaborative work in DANCE 531. Offered: Sp.

DANCE 531 Choreographer/Composer Collaborative Performance (3, max. 9) Collaboration between choreographers and composers culminating in public performance. Offered: Sp.

DANCE 544 Early Dance History (3-5) Study of the evolution of dance from ritual to a theatre art form. .

DANCE 545 Late Dance History (3-5) Roots of contemporary dance as an art form and its relationship to developments in ballet since the turn of the century.

DANCE 590 Dance Teaching Methodologies (3-5) Wiley Introduction to dance pedagogy with an emphasis on motor learning skills and biomechanics. Practical teaching experience. .

DANCE 595 Master's Project (3) Project in area of interest developed in consultation with faculty advisor and supported by elective courses. Full faculty approval of proposed project by end of first year. Formal presentation, appropriate to project's content, presented to full faculty during second year. Project culminates in the teaching of an undergraduate dance course.

DANCE 600 Independent Study or Research (*, max. 10) .

Digital Arts and Experimental Media

DXARTS 198 Digital Arts Seminar (5, max. 10) VLP Topics vary and are announced during the preceding quarter. Taught by UW faculty and visiting artists, engineers, scientists, and humanities scholars.

DXARTS 200 Digital Art and New Media: History, Theory, and Practice (3) VLP

Provides a historical and critical overview of artists and scientists pioneering the digital arts. Discusses important digital media issues from aesthetics, creative strategies, emerging trends, and socio-cultural aspirations.

DXARTS 201 Fundamentals of Digital and Experimental Art I (5) VLP Principles of digital media creation through a combination of lectures, practical assignments, and studio seminars. All resources, assignments, and reviews are web-based. Requires access to a fast, networked computer outside of class. Prerequisite: DXARTS 200.

DXARTS 202 Fundamentals of Digital and Experimental Art II (5) VLP Server-based art course. Introduces principles of digital media creation. All resources, assignments, and reviews are web-based. Requires access to a fast, networked computer outside of class. Prerequisite: DXARTS 201.

DXARTS 400 Undergraduate Research Studio (2, max. 6) VLP Covers recent advances and current trends in digital arts and experimental media research. Topics may include in-depth examination of new artwork and research by pioneering figures in the field.

DXARTS 411 Applications of Digital Technologies to Humanities Research (5) VLP Hands-on project-based approach to imaging, new media, text, databases, metadata and accessibility, rights management, and other issues central to contemporary humanities research. Offered: jointly with HUM 411.

DXARTS 430 Algorithmic Processes in the Arts (5) VLP Basics of computer programming and algorithmic thinking in digital arts. Emphasis on experimental art forms where building of custom software is integral to realizing an artistic vision.

DXARTS 440 Fundamentals of Interactive 3D Art (5) VLP *Andrews* Introduction to fundamental techniques for the creation of interactive graphics-based three-dimensional digital art. Concepts and techniques include the use of scripting and modeling as methods for designing spaces. Strong emphasis on interactivity, aesthetics, and the exploration of time-based art. Contextualizes navigable digital environments within the history of the visual arts.

DXARTS 441 3D Space I: Computer Modeling and Environments (5) VLP *Andrews* Introduction to 3D graphics for experimental artists. Utilizes sophisticated software tools to explore object modeling, environment construction, surface texturing, and image rendering. Through lectures, viewings, tutorials, and projects, students develop a multi-purpose skill set that can be used for innovative content creation, visualization, project planning, documentation, and cross-media integration. Offered: A.

DXARTS 442 3D Space II: Computer Motion and Advanced Techniques (5) VLP *Andrews* Further investigation into 3D visualization for experimental artists. Building on foundations established DXARTS 441, introduces methods for orchestrating movement, including deformation, dynamics, and rigging. Also covers techniques such as particle systems, simulation, and scripting, giving students experience using advanced tools for envisioning and creating original artwork. Prerequisite: DXARTS 441. Offered: W.

DXARTS 443 3D Space III: Special Topics in 3D Computer Arts (5) VLP *Andrews* In-depth exploration of topics in advanced 3D arts research, specific subjects vary. Students integrate skill developed in DXARTS 441 and DXARTS 442 to realize ambitious art projects related to particular class focus. Sample topics include virtual reality, interactive 3D, networked environments, and rapid prototyping. Prerequisite: DXARTS 442. Offered: Sp.

DXARTS 450 Digital Video Foundations (5) VLP *Brixey* Digital video studio designed towards the individual creation of experimental short films and video art. Emphasis on art-making, conceptual thinking, and experimentation. Focuses on core generative processes of digital film, including preproduction, production, and presentation. Students work individually and in small teams.

DXARTS 451 Introduction to Experiments in Digital Video: The Architecture of Time I (5) VLP Introduction to the skills and concepts used in digital video production. Includes exposure to industry standard equipment, terminology, and digital video production skills in experimental arts context. Basic research areas include field production and electronic image gathering, field and studio lighting, basic non-linear editing.

DXARTS 452 Experiments in Digital Video: The Architecture of Time II (5) VLP Nonlinear and nondestructive editing methods used in digital video are defining new architectures of time for cinematic creation. Continues previous digital video research with intermediate nonlinear editing, digital audio, compositing, and digital effects. Focuses specifically on student research with alternative cinematic strategies in an experimental arts context. Prerequisite: DXARTS 451.

DXARTS 453 Experiments in Digital Video: The Architecture of Time III (5) VLP Furthers skills and concepts taught in DXARTS 450 and 451. Emphasizes development of advanced research interests. Research topics include interactive video installation, web-based e-cinema projects, anamorphic image research, video and electronics as support systems for installation, CCTV research, basic D D authoring, and live keying techniques. Prerequisite: DXARTS 452.

DXARTS 460 Digital Sound (5) VLP Foundations of digital sound for digital arts applications. Digital sound theory; transducers; audio signals; mixer architectures; field recording strategies. Multi-track editing for recording, analysis, editing, montage, mixing, synchronization, and mastering. Problem-solving for innovative applications in video, multi-media, and installation art.

DXARTS 462 Digital Sound Processing (5) VLP Introduction to digital sound processing

techniques. Includes sampling techniques and time-domain transformation of samples sound; sample-rate conversion; sound granulation and time stretching; delay lines; introduction to digital filtering; FIR and IIR filters; digital effects; reverberation; virtual-room acoustics and dynamic sound location. Prerequisite: DXARTS 461/MUSIC 401. Offered: jointly with MUSIC 402; W.

DXARTS 463 Advanced Digital Sound Synthesis and Processing (5) VLP Advanced sound processing and synthesis techniques. Includes sound time warping; analysis-synthesis techniques; linear predictive coding; the phase vocoder; frequency-domain sound transformations; introduction to physical modeling. Prerequisite: DXARTS 462/MUSIC 402. Offered: jointly with MUSIC 403; S.

DXARTS 470 Sensing and Control Systems for Digital Arts (5) Software- and hardware-based tools and approaches to real-time I/O and electromechanical control in performance, art installations, and other digital arts applications. Focus on prepackaged but flexible tools. Real-time systems programming and design.

DXARTS 471 Mechatronic Art, Design, and Fabrication I (5) A systems based approach to design and fabrication of functional experimental art devices. Combines principles of mechanical, electronic, electrical, software engineering, robotics, motion control, sensors, actuators, and other control devices. Integrated review of new hardware and software components.

DXARTS 472 Mechatronic Art, Design, and Fabrication II (5) Continues the systems based approach to the design and fabrication of functional experimental art devices. Combines principles of mechanical, electronic and electrical engineering, software engineering, robotics and motion control, application of sensors, actuators, and other control devices. Prerequisite: DXARTS 471.

DXARTS 473 Mechatronic Art, Design, and Fabrication (5) Continues systems based approach to the design and fabrication of functional experimental art devices. Combines principles of mechanical, electronic and electrical engineering, software engineering, robotics and motion control, application of sensors, actuators, and other control devices. Prerequisite: DXARTS 472.

DXARTS 490 Special Topics in Digital Arts and Experimental Media (3-5, max. 15) Taught by UW faculty and visiting artists, engineers, scientists, and humanities scholars.

DXARTS 491 Senior Thesis I (5) VLP Introductory course of the senior thesis sequence. Includes weekly seminars, selection of a thesis topic, and contract with an appropriate faculty advisor. Majors and senior standing only. Offered: A.

DXARTS 492 Senior Thesis II (5) VLP Second course of the senior thesis sequence. Majors and senior standing only Prerequisite: DXARTS 491. Offered: W.

DXARTS 493 Senior Thesis III (5) VLP Third course of the senior thesis sequence. Completion and presentation of final project. Majors and senior standing only Prerequisite: DXARTS 492. Offered: Sp.

DXARTS 495 DXARTS Production Studio (3-15, max 30) VLP Intensive, large-scale,

collaborative, experimental media-based art projects. Examples include major interactive art installations, cinematic works, live computer music performances, and mechatronic or telematic collaborations. Topic vary. Offered: A.

DXARTS 499 Undergraduate Research (1-5, max. 12) .

DXARTS 500 Research Studio (3, max. 30)
Covers recent advances and current trends in digital arts and experimental media research. Students discuss and demonstrate their own ongoing research and creative projects. In-depth examination of new artwork and research by pioneering figures in the field. Prerequisite: DXARTS graduate student.

DXARTS 505 Research Techniques in Digital Arts (3) Digital arts research resources; structuring and strategizing research as part of artistic development; standards for writing and publishing; ethics and approach to technology transfer, and issues such as patenting. Prerequisite: DXARTS doctoral student.

DXARTS 517 Psychology of Audio and Visual Perception in the Arts (5) Processes behind sound and image perception, with emphasis on cognition and practical applications for artists. Includes cross-modal theory and synaesthesia. Prerequisite: DXARTS graduate student.

DXARTS 528 Real-Time Digital Image Processing (5) Theory, aesthetics, and practice of real-time video manipulation/performance systems. Theory and high-level programming of image synthesis and processing. Prerequisite: DXARTS 450; DXARTS 531.

DXARTS 552 Advanced Topics in Digital Video (5) Covers recent advances and current trends in digital video research. May include in-depth examination of new artwork and research by faculty, students, and visiting professionals. Prerequisite: DXARTS 450; and either DXARTS 451 or 452.

DXARTS 565 Spectral Modeling of Sound (5)
Theory and practice of sound modeling in the spectral domain. Custom-designed software for spectral modeling and re-synthesis. Implementation of software tools for spectral analysis, transformation, and synthesis. Prerequisite: DXARTS 463.

DXARTS 567 Sound in Space (5) Theory and practice of spatial sound. Custom-designed software for spatial location of sound. Soundfield microphones used for team-based location recording sessions. Prerequisite: DXARTS 463.

DXARTS 569 Real-time Digital Sound Processing (5) Introduction to real-time digital sound processing techniques. Includes: foundation of real-time systems; integration; reactive environments in performance and installation work; interfaces; communication protocols (MIDI, TCP); feature detection; pitch tracking; transient detection; time-domain processing techniques; frequency-domain processing techniques; algorithmic processes. Prerequisite: DXARTS 463.

DXARTS 598 Advanced Topics in Digital Arts and Experimental Media (3-5, max 21) Covers recent advances and current trends in digital arts and experimental media research. Various topics may include in-depth examination of new art work and research by faculty, students, and visiting professions.

DXARTS 600 Independent Study or Research (1-9, max. 27) .

DXARTS 800 Doctoral Dissertation (*) At least 27 hours of dissertation credit is required for the award of a Ph.D. in Digital Arts and Experimental Media. No more than 10 credits may be taken in any quarter, except summer. Credit/no credit only.

Drama

DRAMA 101 Introduction to the Theatre (5) VLPA The theatre as an art form with emphasis on the play in production. The role of the various theatre artists: actors, directors, designers, and playwrights. Required attendance at one or more performances. Lecture and discussion groups. For nonmajors. Offered: AWSp.

DRAMA 201 Play Analysis (5) VLPA Play structure through analysis of one-act plays in all genres, with special attention to plotting and the various means used to achieve a unity of action as the basis of all drama.

DRAMA 210 Theatre Technical Practice (4) VLPA Intensive lecture-laboratory in basic theories, techniques, and equipment of the stage. Technical procedures.

DRAMA 211 Theatre Technical Practice (4) VLPA *Trout* Intensive lecture-laboratory in basic theories, techniques, and equipment of the stage. Costumes.

DRAMA 212 Theatre Technical Practice (4) VLPA Intensive lecture-laboratory in basic theories, techniques, and equipment of the stage. Stage lighting.

DRAMA 214 Design for Performance (5, max. 10) VLPA Introduction to basic concepts of designing for the performing arts. Emphasis on text analysis, collaboration, and on how the visual and aural development of character and environment relate to a written or musical source. Requires tools and materials used in the creation of collages, models, and mini-performances.

DRAMA 251 Acting (4) VLPA Theory and practice of fundamentals of American "method," based on principles of Stanislavsky and their American evolution. Development of basic acting skills through monologue work. Offered: A.

DRAMA 252 Acting (4) VLPA Theory and practice of fundamentals of American "method," based on principles of Stanislavsky and their American evolution. Direct application of methodology through scene work. Recommended: DRAMA 251. Offered: W.

DRAMA 253 Acting (4) VLPA Theory and practice of fundamentals of American "method," based on principles of Stanislavsky and their American evolution. Preparation of audition material and scene work within the context of entire play. Recommended: DRAMA 251; DRAMA 252. Offered: Sp.

DRAMA 255 UWOnCue (1-4, max. 12) VLPA Improvisational, physical, and vocal training. Approach based on Viola Spolin Improvisation, Michael Chekhov acting method. Suzuki physical training, Anne Bogart's Viewpoints training, and Kristin Linklater's vocal training. Enrollment by audition.

DRAMA 259 Performance Practicum (2-6, max. 12) VLPA Special work in various aspects of performance technique.

DRAMA 290 Theatre Technical Practices Laboratory (1-3, max. 3) VLPA Laboratory course involving specific production assignment, either in-shop or in-theatre or both. Offered: AWSp.

DRAMA 291 Theatre Technical Practices Laboratory (1-3, max. 3) VLPA Laboratory course involving specific production assignment, either in-shop or in-theatre or both. Offered: AWSp.

DRAMA 292 Theatre Technical Practices Laboratory (1-3, max. 3) VLPA Laboratory course involving specific production assignment, either in-shop or in-theatre or both. Offered: AWSp.

DRAMA 298 Theatre Production (1-2, max. 9) VLPA Laboratory course for students participating in School of Drama minor productions and projects. Credit/no credit only. Offered: AWSp.

DRAMA 302 Critical Analysis of Theatre (5) VLPA *Bryant-Bertail*, Analyses of plays, based on leading critical traditions. Illustrates variety of approaches to a play, criteria for choosing best approach for a given play, and ways in which criticism aids in understanding dramatic effect, for both reader and practitioner. Offered: AWSp.

DRAMA 305 Computers in the Theatre (5) VLPA Computing and information systems as problem solving tools for the theatre. Analysis of problems in theatre production and scholarship, with approaches to solutions through computing. Database, spreadsheet, and CAD system applications in the practice and study of lighting and scenic design, theatre management, and research in theatre history and criticism.

DRAMA 313 Scenery Construction (3) VLPA Survey of materials, processes, and equipment in the fabrication, assembly, painting, rigging, and installation of stage scenery and properties. Recommended: DRAMA 210.

DRAMA 314 Introduction to Design for the Performing Arts (3) VLPA *Forrester* Survey of the role of design (scenery, costume, lighting, and sound) in the contemporary performing arts. Consideration of communicative mission and limitations of each of the design areas. Recommended: DRAMA 210; DRAMA 211; DRAMA 212.

DRAMA 316 Theatrical Makeup (2) VLPA Basic principles, with intensive practice in application of makeup for use on proscenium and arena stages. Open to nonmajors.

DRAMA 350 Introduction to Acting Methods (4) VLPA Advanced scene study from three actor-training viewpoints. Approach based in the American "method" through such proponents as Adler, Strasberg, Hagen, Meisner. Exposure to more physically-based systems such as Alexander and Suzuki included. Recommended: DRAMA 252 or equivalent.

DRAMA 351 Intermediate Acting-Scene Study (4) VLPA Actor-training methodologies of Stanislavsky, Meyerhold, Michael Chekov, and other physically-based approaches. Increases understanding of psychological motivation, concentration, focus of attention, clarity of physical expressiveness. Perform three scenes.

Recommended: one of DRAMA 210, DRAMA 211, DRAMA 212; two of DRAMA 290, DRAMA 291, DRAMA 292; DRAMA 253; audition; and 2 credits of DRAMA 466 within two quarters. Offered: A.

DRAMA 352 Intermediate Acting-Verse (4) VLPA *Parker* Addresses character motivation within classical verse of Shakespeare, Moliere, Racine, etc. Sonnets, monologues, scenes in iambic pentameter and rhyming couplet, exploring rhythm, music, and how these relate to character psychology, motivation. Recommended: one of DRAMA 210, DRAMA 211, DRAMA 212; two of DRAMA 290, DRAMA 291, DRAMA 292; DRAMA 253; audition; and 2 credits of 466 within two quarters. Offered: A.

DRAMA 353 Intermediate Acting — Production (4) VLPA Explores the ten-minute play. Focus shifts to full-length play script, developing ensemble playing, sustained concentration, focus of attention, character motivation, and extended through-line. Culminates in public performance. Recommended: one of DRAMA 210, DRAMA 211, DRAMA 212; two of DRAMA 290, DRAMA 291, DRAMA 292; audition; and 2 credits of 466 within two quarters. Offered: Sp.

DRAMA 365 Ethnic Studies in Drama (3-5, max. 15) I&S/VLPA *Curtis-Newton* Theatre and plays, post-World War II to the present. Style, content, and context explored. Emphasis on social, political, and economic milieu from which theatre arose. Playwrights studied may include Alice Childress, August Wilson, Lynn Nottage, Percy Mtwa, Luis Valdez, and Maria Fornes.

DRAMA 371 Theatre and Society (5) I&S/VLPA Introduction to the history of the theatre from the Greeks to the present day. Development of the theatre as a social institution. Reading of major texts from each period.

DRAMA 373 Women in Theatre (5) VLPA Examines both the inclusion and exclusion of women by the cultural practice of theatre. Has two primary aims: to provide an historical overview of women in playwriting, acting, directing and criticism, and to apply contemporary social issues to the practice, texts, and criticism of the stage. Prerequisite: DRAMA 302.

DRAMA 374 History of Greek and Roman Theatre (5) VLPA *Johnson* Survey of Classical and Hellenistic Greek and Roman theatre culture, including texts, architecture, iconography, scenic practices, and conventions of performance from the Festival of Dionysus to the bloodsports of the Roman arenas. Prerequisite: DRAMA 302.

DRAMA 377 History of Medieval and Renaissance Theatre (5) VLPA *Johnson* Survey of the rise of theatre from the early liturgical drama through the High Middle Ages to the Reformation and the great flowering of secular drama in Elizabethan England and the Golden Age of Spain. Prerequisite: DRAMA 302.

DRAMA 378 History of European Theatre, Renaissance to Revolution (5) VLPA *Johnson* Survey of the drama, theatre, and theatre culture from the Italian Renaissance through the French Revolution. Examines the rise of court culture, opera, French neo-classicism, as well as the popular commedia dell'Arte. Prerequisite: DRAMA 302.

DRAMA 391 Beginning Technical Practices (1-3, max. 9) VLPA Laboratory course involving

specific production assignments, either in-shop or in-theatre, or both. Recommended: DRAMA 290; DRAMA 291; DRAMA 292.

DRAMA 401 Senior Seminar (1, max. 2) VLPA *Gates* A professional seminar featuring guest artists and career development specialists. Credit/no credit only. Offered: A.

DRAMA 405 Computer Graphics Systems (3) VLPA Introduction to CAD applications in theatre design and technology. Focus on learning to use general purpose graphics software for CAD. Discussion of available hardware and software. Recommended: DRAMA 420. .

DRAMA 410 Advanced Theatre Technical Practices (2-4, max. 20) VLPA Production-related apprenticeship, in the areas of scene construction, scene painting, costume, or lighting. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 418. Offered: AWSp.

DRAMA 413 Advanced Scene Construction (3) VLPA Special problems in scene construction materials and rigging. Recommended: DRAMA 210; DRAMA 212; DRAMA 290; DRAMA 292; DRAMA 410; DRAMA 420.

DRAMA 414 Scene Design (3, max. 6) VLPA *Dahlstrom, Forrester* Theory, practice, and rendering of scene designs. Repeat of course involves intermediate designs and models. Recommended: ART H 203; DRAMA 210.

DRAMA 415 Stage Costume Design (3, max. 6) VLPA *Trout* Theory, practice, and rendering of costume designs for the theatre. Repeat of course involves intermediate designs. Recommended: ART H 203; DRAMA 211; DRAMA 416 if repeating.

DRAMA 416 History of Western Dress (5) VLPA *Gates* Survey history of Western dress. Emphasis on use of this information by theatrical costume designers. Includes development of costume for drama, ballet, and opera. Prerequisite: DRAMA 302.

DRAMA 417 Stage Costume Patterning and Construction (3, max. 6) VLPA Techniques of costume construction, including study of fabrics; emphasis on creating patterns by draping. Recommended: DRAMA 211; DRAMA 416.

DRAMA 418 Scene Painting (3, max. 6) VLPA *Forrester* Lecture-laboratory with focus on techniques and principles of scene painting. Uses of various media and types of equipment as applicable to varied scenic pieces. Recommended: DRAMA 210.

DRAMA 419 Advanced Stage Lighting Design (3, max. 9) VLPA Development of a working process consistent with current professional practice. Includes drafting, worksheets, study of color. Students read plays and develop analytical skills. Recommended: DRAMA 212.

DRAMA 420 Design and Technical Drafting (2, max. 4) VLPA *Forrester* Laboratory and project critique covering stage design graphics and technical drawing; specifically: designer's elevations, ground plans, sections, detail drawing, transposition of design drawing information to technical drawings. Recommended: DRAMA 210.

DRAMA 421 Drawing and Rendering Techniques for the Theatre (2, max. 10) VLPA *Forrester* Weekly figure-drawing laboratories with

live model and weekly field trips for laboratories in drawing natural phenomena and architectural detail. Studies in historical drawing styles. Practice in use of several media and techniques of expression. Recommended: DRAMA 210; DRAMA 211.

DRAMA 441 Beginning Playwriting (1-6, max. 12) VLPA Writing exercises and drafts of a one-act play provide first experience in writing for performance. Readings of representative one-act plays introduce genres and writing styles. Recommended: DRAMA 253 or DRAMA 353; DRAMA 210; DRAMA 211; DRAMA 212.

DRAMA 450 Rehearsal Laboratory (2, max. 6) VLPA Acting in projects directed by graduate directing students. Recommended: DRAMA 253.

DRAMA 451 Advanced Acting — Production Workshop (4) VLPA Improvisation skills. Methodology employed develops one five-minute solo work, using either original or adaptations of non-dramatic texts. Culminates in two public showings of the five-minute one-person works. Offered: A.

DRAMA 452 Advanced Acting — Scene Study (4) VLPA Invites actor to create a role. Script reading for action and consequence. Use and employment of five senses to express a character's life, presenting a coherent and alive person to the stage. Culminates in public performance. Offered: W.

DRAMA 453 Advanced Acting — Physical Training (4) VLPA Introduction to physical training methods of Tadashi Suzuki, Kenji Suzuki, and the relationship of their methodologies to Constantin Stanislavsky. Contemporary monologues analyzed for psychological motivation, while exploring the physical analog of "action" as expressed and accessed by the new physical training. Offered: Sp.

DRAMA 454 Projects in Acting (3, max. 9) VLPA Rehearsal and classroom performance of dramatic literature of various periods and styles.

DRAMA 455 Alexander Technique (3) VLPA *Madden* A practical and theoretical introduction to the Alexander Technique, a psychophysical re-education process developed by F. M. Alexander (1869-1955). Studio application of this work improves physical/vocal coordination, enhances creativity, and clarifies thinking.

DRAMA 460 Introduction to Directing (4) VLPA *Curtis-Newton*, Student is introduced to the art of the stage director. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 253 or DRAMA 353; DRAMA 302. Offered: A.

DRAMA 461 Elementary Directing (4) VLPA *Curtis-Newton* Elementary study of the art of the stage director. Recommended: DRAMA 460.

DRAMA 462 Elementary Directing (4) VLPA Elementary study of the art of the stage director. Recommended: DRAMA 461.

DRAMA 466 Stage Management (2-5, max. 15) VLPA *Stewart* Study and practice of stage management. Recommended: DRAMA 210; DRAMA 211; DRAMA 212; DRAMA 290; DRAMA 291; DRAMA 292.

DRAMA 471 History of the English Restoration and 18th Century Theatre (5) VLPA *Johnson* Examination of the relationship of the physical theatre and the productions that took

place within that theatre. Particular emphasis on the text performed, styles of acting, scenic elements, and the critical theories that influenced the theatre of the period. Prerequisite: DRAMA 302.

DRAMA 472 European and American Theatre, Revolution to Modernism (1780-1920) (5)
VLPA *Johnson* Survey of the drama, theatre, and theatre culture from the French Revolution into the beginnings of Modernism; social and political aspects of theatre, rise of Romanticism, melodrama, and variety entertainment through the 19th century to the artistic revolution that paved the way for modern theatre. Prerequisite: DRAMA 302.

DRAMA 473 Modern European Theatre and Drama (5) VLPA *Witham* Major movements and figures in contemporary European theatre from French absurdism to the present. Prerequisite: DRAMA 302.

DRAMA 475 Modern English Theatre and Drama (5) VLPA *Witham* Major trends in contemporary English theatre, post-World War II to the present. Performers, dramatists, and designers who shaped the course of the theatre following the "angry young rebellion" of the 1950s. Prerequisite: DRAMA 302.

DRAMA 476 Modern American Theatre and Drama (5) VLPA *Witham* Major forces shaping modern American theatre, Eugene O'Neill to the present. Leading dramatists, directors, and designers of the post-World War II era. Experiments such as the Federal Theatre Project, Group Theatre, and Living Theatre. Prerequisite: DRAMA 302.

DRAMA 490 Special Studies in Acting-Directing (1-6, max. 12) VLPA .

DRAMA 491 Special Studies in Design-Technical (1-6, max. 6) VLPA .

DRAMA 494 Special Studies in Theatre and Drama (5, max. 20) VLPA *Bryant-Bertail, Johnson, Witham* Topics in drama, history, and criticism. See Time Schedule for specific topic. Prerequisite: DRAMA 302.

DRAMA 495 Practicum in Design and Technical Theatre (2-6, max. 15) VLPA
Emphasis on developing design and technology problem-solving skills through laboratory and project evaluation. Recommended: DRAMA 211, DRAMA 212, DRAMA 313.

DRAMA 496 Stage Costume Problems (2, max. 8) VLPA Specific research problems of stage costume design and execution: accessories, masks, wigs, fabric modification, millinery or construction analysis for specialized costumes. Topics vary. Recommended: DRAMA 211; DRAMA 416.

DRAMA 498 Theatre Production (1-2, max. 9) VLPA Laboratory course for students participating in School of Drama major productions. Credit/no credit only. Offered: AWSp.

DRAMA 499 Undergraduate Research (1-5, max. 15) .

DRAMA 502 Designer-Director Analysis (4)
Dahlstrom Methods of examining plays to make the collaboration of director and designer productive. Attempts to create a structural whole from visual and verbal approaches to analysis. Prerequisite: graduate standing in drama.

DRAMA 510 Design Studio (3, max. 18)
Dahlstrom, Forrester, Trout Investigation of space, form, light, texture, and color in total theatre design, stressing mastery of the media, methods of presentation and execution, and intelligent and appropriate visual reaction to a dramatic text. Prerequisite: graduate standing in drama.

DRAMA 512 Lighting Design Seminar (1/4, max. 18) Forum for graduate lighting students to further explore the art of lighting design. Assignments include paper projects, School of Drama production, and field trips to local theatres. Prerequisite: graduate standing.

DRAMA 514 Design and Technical Theatre Colloquium (2, max. 18) Discussion of work in progress or completed in production, centering on the conceptual work of the designer/director on the production and the methods of execution in the shops and on stage. Offered: AWSp.

DRAMA 518 Studies in Historic Design (3)
Dahlstrom Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods.

DRAMA 519 Studies in Historic Design (3)
Dahlstrom Investigation of artistic principles and modes that influenced the art, architecture, furniture, and decor of selected historic periods. Prerequisite: DRAMA 518, or permission of instructor.

DRAMA 520 Advanced Theatre Practicum (1-5, max. 15) Professional student internship with professional theatres: scenery, lighting, scene painting, costume, acting, directing, stage management, theatre management. Prerequisite: permission of instructor.

DRAMA 551 Teaching of Acting (1-3, max. 3)
Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 552 Teaching of Acting (1-3, max. 3)
Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 553 Teaching of Acting (1-3, max. 3)
Seminar discussion on problems in teaching acting to undergraduate students in 251, 252, and 253. Prerequisite: permission of instructor and being a teaching assistant in acting.

DRAMA 555 Studies in Acting (2-6, max. 18)
Individual or group work on special skills for the actor. Topics vary. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

DRAMA 557 Studio I (12, max. 36) *Hunt, Jenkins, Jory, Madden, Pearson, Shahn* Skill development in acting, voice, speech, and movement necessary for professional training in acting. Prerequisite: admission to the Professional Actor Training Program. Offered: AWSp.

DRAMA 558 Studio II (12, max. 36) *Hunt, Jenkins, Jory, Madden, Pearson, Shahn* Continuation of 557. Prerequisite: DRAMA 557 and completion of the first year of the Professional Actor Training program. Offered: AWSp.

DRAMA 559 Studio III (6, max. 18) *Hunt, Jenkins, Jory, Madden, Pearson, Shahn*

Specialized and individualized work relating to the main curriculum of the third year of the Professional Actor Training Program. Prerequisite: DRAMA 558 and completion of the second year of the Professional Actor Training Program. Offered: AWSp.

DRAMA 560 Managing the Rehearsal and Production Process (2) Introduction to graduate-level directing. Play analysis, research, performance theory, and concept development as it relates to process-acting and rehearsal, design, staging techniques, and production management. Reading and writing assignments augmented by faculty and professional guests in performance, design, production, and dramaturgy.

DRAMA 561 Directing Projects (2-3, max. 12)
Rehearsal techniques and staging skills in a variety of spatial configurations. One-act and full-length plays which follow a prescribed sequence. Prerequisite: graduate standing in the directing program.

DRAMA 562 Performance Studio (1-3, max. 12) Performance techniques in specialized areas of importance to the professional director, including stage combat, speech and dialect, mask, physical comedy, improvisation, and puppetry.

DRAMA 563 Seminar in Directing (2, max. 18)
Seminar discussion of current productions; focused readings and discussion in specific areas of dramatic literature and problems related to stage direction. Prerequisite: graduate standing in drama and permission of instructor.

DRAMA 564 Theatre Studies: History, Theory, Criticism (3, max. 15) Special topics in history, theory, and criticism.

DRAMA 565 Verse Workshop (4) Techniques necessary to direct and perform plays of Shakespeare, Moliere, and other verse playwrights: scansion and imagery; period and style using verse text; crowd scenes, transformations of time and space, and other staging exercises; direction of scenes or acts from verse plays.

DRAMA 566 Directing for the Camera (3)
Story-boarding, setting up camera shots, improvisation, and rehearsal techniques for directing actors on camera (both in studio and on location). Students direct one- and two-camera scenes; and write, direct, and edit a short screenplay.

DRAMA 567 Acting Process (1-3, max. 12)
Development of acting skills necessary for the professional director. Emphasis on physical training, playing action, strong internal technique, imagination and clarity of expression.

DRAMA 568 Writing for the Stage (3, max. 6)
Focus on adaptation for the stage of non-dramatic sources, such as literature, poetry, history, and contemporary events. Emphasis on structure, dialogue, dramatic action, rhythm, characterization. Writing exercises using fictive and non-fictive sources, biographical sources, and found objects. For MFA Directing students only.

DRAMA 569 Directing/Teaching Apprenticeship (3) Assisting faculty or professional guest director in production for the entire rehearsal period, or assisting faculty in performance training.

DRAMA 571 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 572 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 573 Problems in Theatre History Research (5) *Johnson, Witham* Methods and techniques of research, interpretation, and writing in theatre history. Relationship of theatre arts to culture in diverse periods and places.

DRAMA 575 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 576 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 577 Seminar in Theatre History (5) *Johnson, Witham* Specific topics in theatre history, examining the drama of various national, linguistic, and/or religious culture in detail.

DRAMA 581 Analysis of Dramatic Texts (5) *Bryant-Bertail* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 582 Analysis of Dramatic Texts (5) *Bryant-Bertail* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 583 Analysis of Dramatic Texts (5) *Bryant-Bertail* Analytic approaches to dramatic materials, concentrating on semiotics, Marxism, feminism, or a related critical theory.

DRAMA 585 Seminar in Dramatic Theory (5) *Bryant-Bertail* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

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DRAMA 587 Seminar in Dramatic Theory (5) *Bryant-Bertail* Major problems in dramatic theory, such as aesthetics, mimesis, and the nature of theatre.

DRAMA 599 Advanced Studies in Theatre Arts (1-5, max. 10) Independent projects or group study of specialized aspects of theatre arts. Prerequisite: permission of instructor.

DRAMA 600 Independent Study or Research (*) .

DRAMA 700 Master's Thesis (*) .

DRAMA 800 Doctoral Dissertation (*) .

Earth and Space Sciences

ESS 100 Dinosaurs (2) NW Biology, behavior, ecology, evolution, and extinction of dinosaurs, and a history of their exploration. With dinosaurs as focal point, course also introduces the student to how hypotheses in geological and paleobiological science are formulated and tested.

ESS 101 Introduction to Geological Sciences (5) NW Survey of the physical systems that give the earth its form. Emphasizes the dynamic nature of interior and surface processes and their relevance to mankind and stresses the value of rocks and earth forms in the understanding of past events. A course with laboratory for non-science majors. Not open for credit to students who have taken ESS 105, or ESS 210. Field trips. Offered: AWP.

ESS 102 Space and Space Travel (5) NW Explores powering the sun, making of space weather conditions, observations from space and from Earth, Earth's space environment, radiation belts and hazards, plasma storms and auroras, electron beams, spacecraft requirements, tooling up for manned exploration. Open to non-science majors.

ESS 103 Minerals and Gems (3) NW Introduction to the nature of minerals: composition, structure, physical properties, and origins, with emphasis on gem minerals. Focuses on topics of particular interest in gemology, such as mechanisms of color, history and lore of gems, and uses of gems. Hands-on laboratories using about one hundred representative gems and minerals.

ESS 104 Prehistoric Life (3) NW Fossils and how they are preserved. What fossils tell us about past life and environments. How the history of life unfolded and what caused the great events in biological evolution. Open to non-science majors, but also lays a foundation for higher-level geobiology courses.

ESS 105 The Earth: Its Processes and Hazards (5) NW Introduction to physical and environmental geology. Focuses on both large-scale tectonics forces that create Earth's continents and oceans, and surficial forces that shape Earth's landscapes. Emphasizes processes that endanger human populations (such as earthquakes, volcanic eruptions, and floods). Not open for credit to students who have taken ESS 101.

ESS 106 Living with Volcanoes (3) I&S/NW Explores volcanoes and volcanic eruptions on Earth and in the solar system. Examines how volcanoes work and how they affect the environment, life, and human societies. Illustrates principles using local examples of recent volcanism and ancient examples of mega-eruptions. Evaluates the possibility of predicting future eruptions.

ESS 107 Environments of Washington Through Geologic Time (5) NW Introduces students to the geologic and paleontologic history of our region. Students collect data from field studies and museum collections of fossils and rock to reconstruct ancient environments, creating paleogeographic and paleoclimatic maps through geologic sequences of time. Includes three, one-day field trips on weekdays.

ESS 115 Astrobiology: Life in the Universe (5) NW Introduction to the new science of astrobiology, study of the origin and evolution of life on Earth, and the search for microbial and intelligent life elsewhere in the Universe. Designed for non-science, liberal arts majors. Offered: jointly with ASTBIO/ASTR/OCEAN 115/BIOL 114.

ESS 201 The Earth System and Climate (5) NW Earth's dynamic environment, global energy balance, interplay of chemical, physical, and biological processes shaping the Earth's surface and climate. Emphasis on quantitative methods for measuring, evaluating, and understanding contemporary changes relative to the last several thousand years. Prerequisite: either MATH 124, MATH 144, or Q SCI 291.

ESS 202 Earthquakes (5) NW Earthquakes of the Pacific Northwest and around the world — their cause and relationship to plate tectonics; why, where, and when they occur. How earthquakes affect human life: shaping landscape, hazards. Laboratory explores physical processes associated with earthquakes. One field trip. Open to non-science majors.

ESS 203 Glaciers and Global Change (5) NW Glaciers in Washington and the world. The ancient atmosphere inside of glaciers. Changes in glaciers now and ice-age cycles. Glaciers, global sea level and climate in the future. Open to non-science majors.

ESS 205 Access to Space (5) NW Group development of student experiments to the outer rim of our atmosphere and the beginning of space; investigation of stratosphere, mesosphere, thermosphere, magnetosphere, development of exploration packages; basic electronic fabrication, global positioning, radio tracking, expectations at high altitudes. Open to all disciplines. No previous experience of electronics required.

ESS 209 Interdisciplinary Earth Sciences Field Seminar (3-12, max. 12) NW Miscellaneous field-based and experiential learning activities in Earth and Space Sciences.

ESS 210 Physical Geology (5) NW Introduction to the physical and chemical processes of the earth's surface and interior. Plate tectonics, earthquakes, volcanism, glaciation. Optional field trips to Cascades and Olympics. Background in geology not required but science background desirable. Not open for credit to students who have taken 101.

ESS 212 Earth Materials and Processes (5) NW Crystallography, crystal chemistry, and characteristics of rock-forming and ore minerals. Description, phase equilibria, origin, and associations of igneous, sedimentary, and metamorphic rocks. Laboratory study of hand specimens. Two one-day field excursions. Prerequisite: CHEM 142. Offered: W.

ESS 213 Evolution of the Earth (5) NW Introduction to paleontology, types of stratigraphy, and radiometric dating. The physical, chemical, biological, and plate tectonic evolution of the earth's crust, seawater, and atmosphere. Comparison with other planets. Climate changes and man as a geologic agent. Two one-day field excursions. Prerequisite: ESS 211. Offered: Sp.

ESS 230 Rivers and Beaches (3/5) NW Introduction to Earth surface environments, the processes that shape them, how humans affect them and are affected by them. Weekend field

trips examine mountains, rivers, deltas/estuaries, beaches, and environments beyond. Focus on linkages between these environments to illustrate coupling between landscapes and seascapes. Offered: jointly with OCEAN 230.

ESS 301 Geology of the Northwest (5) NW Geologic history of Washington, Oregon, and Idaho. Emphasis on use of geologic principles in interpreting evidence found in landscapes and rocks. Weekend field trips optional. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211.

ESS 302 Great Ice Age (5) NW Growth of mile-thick ice sheets, worldwide lowering of sea level, and other geological and paleoclimatological changes that accompany the harsh environments of a global glaciation. Geology of the last three million years, focusing on the causes and effects of global glaciation and future climate change. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211..

ESS 303 Geologic Hazards (5) NW Geological forces dramatically alter the earth's surface, devastating communities, taking human lives. Uses lectures and field work to examine geological hazards affecting civilizations around the world. Northwest examples illustrate causes and effects of many catastrophic geological processes, including: earthquakes, volcanoes, floods, glaciers, landslides. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211.

ESS 304 Volcanoes and Glaciers of the Pacific Northwest (5) NW Introduction to volcanic and glacial processes, emphasizing examples in the Pacific Northwest. Volcanic products, landforms, hazards, prediction, and history. Relationship to tectonics. Nature and distribution of present and former glaciers in Washington. Two all-day Saturday field trips to Cascade volcanoes required.

ESS 305 Earthscapes (5) NW Introduction to study of landforms and geomorphic processes. Topics include tectonics, volcanoes, weathering, soils, erosion, mass wasting, rivers, glaciers, coastal landscapes, and arid landscapes. Laboratory analysis of landforms, with the writing of scientific abstracts, is included. Optional weekend field trips introduce students to geomorphic landscapes found in western Washington. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211.

ESS 306 Planetary Geology (5) NW Up-to-date survey of geological features and processes on and within planets and their moons deduced from sampling, remote sensing, spacecraft imagery, and theory. Comparative discussion of volcanism, tectonics, surface processes, and thermal evolution. Examination of moon rocks and meteorites. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211.

ESS 311 Geomechanics (5) NW Introduction to continuum mechanics: elasticity, fluid dynamics, diffusion, porous flow, multiphase flow, dimensional analysis, and natural convection. Example applications: earthquakes and rock mechanics, flow of glaciers, slope stability, debris flows, groundwater flow, contaminant transport, flow in rivers and channels, mantle and magma convection. Prerequisite: either MATH 125 or Q SCI 292; either PHYS 114/117 or PHYS 121. Offered: W.

ESS 312 Geochemistry (5) NW Geochemical concepts essential to earth science studies. Crystal chemistry and elemental affinities,

thermodynamics of geologic processes, trace element and isotopic fractionation, weathering, cosmochemistry, and exploration of basic global geochemical cycles. Laboratory exercises explore the dynamics of geochemical processes. Prerequisite: either CHEM 142; either MATH 125 or Q SCI 292; ESS 212. Offered: Sp.

ESS 313 Geobiology (5) NW Introduction to the early record of life on earth. Environmental factors leading to life's diversification. The role of life in biomineralization. The history of biodiversity. The role of life in landform and soil formation. Laboratory exercises demonstrate specimens and techniques. Prerequisite: CHEM 142; either PHYS 114/117 or PHYS 121.

ESS 314 Geophysics: Expedition to Planet Earth (5) NW Survey of fundamental geophysics using an investigative approach. Examines how a future expedition of extraterrestrial humanoids could use geophysical data, physical principles, and mathematical techniques to decide whether they should colonize Earth and understand why the indigenous civilization became extinct. Prerequisite: MATH 126; either PHYS 115/118 or PHYS 122.

ESS 315 Environmental Earth Science (5) NW Analysis of geologic constraints upon human activity and the environmental consequences of such activity. Topics include hillslope processes, fluvial and groundwater processes, earthquake and volcanic hazards, and environmental aspects of deforestation and atmospheric pollution. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211. Offered: jointly with ENVIR 313.

ESS 326 Geomorphology (5) NW Introduction to landforms and surficial deposits. Emphasis on landscape-forming processes. Intended for students who wish to take additional courses in geomorphology. Prerequisite: either PHYS 114 or PHYS 121. Offered: W.

ESS 345 The Environment of Fuel and Mineral Deposits (3) I&S/NW Fuels and nonmetallic ores as the substrate of industrial civilization. Provides non-majors with sufficient information about these resources to allow for informed decisions of related geological, environmental, and societal issues. Prerequisite: either ESS 101, ESS 105, ESS 210, ESS 211.

ESS 401 Regional Geology of the Pacific Northwest (3) NW Explores the geological diversity of the Pacific Northwest temporally (Archean to Pleistocene), tectonically (craton, terranes, and cover sequences), and lithologically (ophiolites to coal). Three weekend field trips required.

ESS 402 International Field Geology (3-12, max. 12) NW Supervised geological field work in classic, instructive international sites. Venue varies from year to year. Work may include geologic mapping, construction of cross sections, measurement and analysis of stratigraphic sections, field excursion, and supervised individual research projects.

ESS 403 Plate Tectonics (4) NW Introduction to the principles and methods of plate tectonics, including motions on a sphere, polar-wander paths, plate-boundary seismicity, and focal mechanisms. Also includes modern observations and theories of plate deformation and continental dynamics. Prerequisite: PHYS 121.

ESS 406 Earth Sciences for Middle and High School Science Teachers: Solid Earth (3) NW

Topics of contemporary interest selected to meet state academic standards. Topics include Pacific Northwest earthquakes and volcanoes, global and regional plate tectonics, history of the Earth, the Earth's interior, planetary geology, and surface processes on the Earth. Does not count toward the ESS degree. Prerequisite: ESS 101.

ESS 410 Marine Geology and Geophysics (4) NW Sedimentological and petrologic processes that determine the geologic record. Prerequisite: either ESS 101 or ESS 210. Offered: jointly listed with OCEAN 410..

ESS 411 Geophysical Continuum Mechanics (3) NW Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Prerequisite: either MATH 136 or both MATH 307 and MATH 308.

ESS 412 Seismology (3) NW Introduction to theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibrations, ray theory. Structure of the Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Prerequisite: either ESS 411; recommended: concurrent registration in ESS 466.

ESS 413 Geophysics: The Earth (3) NW The earth and its interior; gravity, magnetism, heat flow, seismology. Earth's outer structure, studied through the unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Prerequisite: either ESS 412; PHYS 322.

ESS 414 Geophysics: Fluids (3) NW Introduction to geophysical fluid dynamics. An overview of fluids in geophysics with emphasis on the oceans. A nonrigorous development of the equations of motion with examples drawn from oceanography and solid earth geophysics. Prerequisite: either MATH 136 or both MATH 307 and MATH 308; PHYS 322.

ESS 415 Space and Plasmas (3) NW Survey of various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Prerequisite: PHYS 321.

ESS 416 Geophysics: The Atmosphere (3) NW Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Prerequisite: ESS 414 .

ESS 421 Introduction to Geological Remote Sensing (4) NW Principles of image interpretation for geologists. Study of land forms, structure, lithology, surface processes using aircraft and satellite data. Use of digital multispectral images and radar images for geological mapping.

ESS 422 Intermediate Spectral Remote Sensing (4) NW Explores spectral image processing with ENVI software, used in individualized projects involving satellite or aircraft images. Emphasis on integration of remote sensing and field measurement using process models and Geographic Information Systems (GIS). Recommended: introductory

courses in physics, chemistry, calculus, geology, and field geology. Prerequisite: ESS 421.

ESS 424 Water in the Environment (3) NW

Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ATM S 460/PHYS 460.

ESS 426 Fluvial Geomorphology (5) NW

Hydraulic and morphological characteristics of streams and valley floors. Landscape evolution by stream erosion and deposition. Field exercises emphasize quantitative analysis of fluvial processes, channel forms, acquisition of various skills, such as mapping, topographic surveying, report writing. Prerequisite: either ESS 311, or ESS 326.

ESS 427 Hillslope Geomorphology (5) NW

Theoretical, laboratory, and field study of hillslope evolution by mass wasting and water erosion. Prerequisite: either ESS 311, or ESS 326.

ESS 428 Landscape Evolution (5) NW

Advanced examination of landscape evolution. Emphasis on interactions among tectonics, climate, and hillslope, fluvial, and glacial processes. Intended for seniors and graduate students in geomorphology and related disciplines. Prerequisite: either ESS 426, or ESS 427.

ESS 431 Principles of Glaciology (3) NW

Snow deposition and metamorphism, avalanches, heat and mass balance at snow and ice surfaces, glacier flow, ice sheets, sea ice, permafrost, methods of paleoclimate reconstruction, Ice Age theories. Prerequisite: PHYS 121; PHYS 122.

ESS 432 Glacial Geology (5) NW

Interpretation of glacial environments and history through study of sediments and landforms. The laboratory component is largely field based and visits some spectacular glaciated landscapes. Provides students an experiential learning approach to the field as well as an opportunity to conduct independent research.

ESS 433 Environmental Change in the Glacial Ages (3) NW

Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with QUAT 417.

ESS 437 Mineralogy (5) NW

Symmetry of crystals and crystal structures. Rules of crystal chemistry. Microscopic, diffraction, and spectroscopic techniques of mineral characterization. Transformation processes in minerals: order-disorder, phase transition, and exsolution. Crystal chemistry and phase relations. Reactions on mineral surfaces. Physical properties, deformation, and creep. Prerequisite: CHEM 142; ESS 212; ESS 312.

ESS 439 Petrology of Igneous Rocks (5) NW

Systematic study of the major families of volcanic and plutonic igneous rocks with emphasis on tectonic setting, phase relations, geochemistry, and models of their origin and evolution throughout geologic time. Laboratory emphasizes thin-section study of rocks using transmitted and reflected light. Prerequisite: ESS 312.

ESS 440 Petrography and Petrology of Metamorphic Rocks (5) NW

Mineralogy, textures, and origins of metamorphic rocks; metamorphic facies and metamorphic phase equilibria; controls of metamorphism. Prerequisite: ESS 312; ESS 438.

ESS 441 Petrology and Petrography of Sedimentary Rocks (5) NW

Mineralogy, textures, and origin of sedimentary rocks, using petrographic microscope. Prerequisite: ESS 312.

ESS 445 Geology of Ore Deposits (5) NW

The geologic principles, environmental aspects, and exploration strategies of selected types of metallic and nonmetallic ore deposits and coal. Prerequisite: ESS 312.

ESS 450 Paleobiology (3) NW

Biological evolution over the past 500 million years, considering how the reciprocal interactions between environment and evolution have influenced the major episodes in life's history and providing a background for assessing the evolutionary impact of modern environmental change.

ESS 451 Invertebrate Paleontology (5) NW

Important larger invertebrate groups; morphology, classification, stratigraphic distribution, evolution, paleoecology. Offered: jointly with BIOL 451.

ESS 452 Fossil Vertebrates (5) NW

Highlights in evolutionary history of the fossil vertebrates, from early Paleozoic fishes through late Cenozoic mammals. Morphology, adaptations, relationships of the major groups. Bone structures and systematic relationships. Field trip. Prerequisite: either BIOL 101, or ESS 100.

ESS 453 Fossil Mammals (5) NW

Evolutionary relationships of fossil mammals, from mammal-like reptiles of late Paleozoic to diverse Cenozoic groups. Morphology, adaptations, extinctions, evolutionary patterns. Structures and relationships of most major groups. Field trip. Prerequisite: either BIOL 101, ESS 100, or ESS 452.

ESS 455 Stratigraphy (4) NW

Systematic study of stratified rocks and space-time implications. Principles of stratigraphy, including biostratigraphy, magnetostratigraphy, seismic stratigraphy, subsurface analysis. Basin analysis, evolution of sedimentary basins and continental margins. Prerequisite: ESS 213.

ESS 456 Depositional Environments (4) NW

Principles of sedimentary facies analysis, including survey of modern processes that produce sedimentary sequences. Recognition of various depositional environments represented in the geologic record, including terrestrial, marine terrigenous, and carbonate environments. Two field trips required. Prerequisite: ESS 213.

ESS 457 Environmental Geochemistry (4) NW

Examines the geochemistry of natural waters, emphasizing applications in geological and soil sciences. Topics include soil/ground water composition; weathering and the carbon cycle; equilibrium computer modeling; colloids and clay minerals; organic geochemistry of water and soil; and groundwater quality. Experience with geochemical instrumentation. Prerequisite: ESS 312, CHEM 152, or CHEM 155.

ESS 458 Isotope and Trace Element Geology: Lithosphere (3) NW

Radiogenic isotopes and trace element as petrogenetic indicators; evolution of earth's major geochemical

reservoirs; application to problems in igneous, metamorphic, sedimentary petrology; stable isotope geothermometry; nucleosynthesis, origin, and chronology of solar system formation; U-Th disequilibrium series. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; ESS 312.

ESS 459 Environmental Isotope Geology (3) NW

The geochemistry of stable isotopes. Topics include the theory of isotope fractionation, application of isotopes in earth surface processes, climate, and biogeochemical cycles. Includes extensive laboratory experience. Prerequisite: ESS 312.

ESS 460 Cosmogenic Nuclides in Geomorphology (3) NW

Use of cosmic-ray-produced nuclides to date rock surfaces and analyze geomorphic processes. Nuclide production by cosmic radiation above and below ground; tracer methods; exposure dating; coupling of cosmogenic nuclide data to geomorphic models. Open to undergraduate students only. Prerequisite: either ESS 312 or ESS 313.

ESS 461 Geological Time (3) NW

Principles of radiometric dating. Methods applicable to Earth history from planetary formation to the recent past. Radiocarbon dating; geological dating with long-lived isotopes; uranium series, trapped charge and cosmogenic isotope techniques. Applications in archaeology, climate change, geomorphology, tectonics, and Earth evolution.

ESS 462 Volcanic Processes (4) NW

Pre-eruption, eruption, and post-eruption processes. Examines triggers of magma ascent, controls on volatile build-up and loss, magma fragmentation, magma-groundwater interaction, eruption column dynamics, gravity-controlled eruptive phenomena, syn- and post-eruption lahars and other reworking of deposits. Prerequisite: either ESS 311 or ESS 312.

ESS 463 Structure and Tectonics (5) NW

Geometry, kinematics, and tectonic setting of major types of structures, including those in contractional fold-and-thrust belts; extended crust; strike-slip-dominated regimes; and shear zones. Laboratory exercises develop basic tools of structural geology. Prerequisite: ESS 213.

ESS 464 Geodynamics (4) NW

Principles of continuum mechanics, their application to flow of water, mud, magma; deformation of soil, rock, ice. Emphasis on sound physical understanding of these principles and use of elementary mathematics in their application to earth sciences problems. Prerequisite: ESS 311; either MATH 126, MATH 129, or MATH 136; PHYS 121.

ESS 465 Seismology and Earthquake Engineering (3) NW

Overview of earthquake processes and details of the characteristics of destructive ground motion; effects of such motion on engineering structures; current practice in estimating earthquake hazards for important structures such as nuclear power plants. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: jointly with CEE 431.

ESS 466 Applied Seismology (2) NW

Interpretation methods in seismology. Seismogram interpretation, including body and surface waves. Seismic instrumentation. Earthquake location, magnitude, and fault-plane solutions. Seismic reflection and refraction methods. Measurement and interpretation of strong ground motion near the epicenter of large earthquakes. Recommended: concurrent registration in ESS 412.

ESS 467 Seismic Exploration (5) NW

Introduction to theory and practice of seismic exploration. Application of refraction and reflection techniques to problems in engineering geology and mineral exploration. Constraints in the interpretation of subsurface structure. Prerequisite: ESS 311; either MATH 126, MATH 129, or MATH 136; PHYS 123.

ESS 471 Introduction to Space Physics (3) NW

Introduces several areas of space physics, the physical principles that apply therein, and the methods by which significant observations are made. Covers electromagnetic and plasma processes from the center of the sun to the surface of the earth. Prerequisite: PHYS 123.

ESS 489 Honors Seminar (3) *Bourgeois*

Covers current scientific topics in Earth and Space Sciences; philosophy and methodology of science strategies for developing research projects; scientific education and career planning. May require colloquium or local conference attendance. Offered: A.

ESS 490 Special Topics (2-10, max. 20) NW .**ESS 492 Undergraduate Teaching Experience and Outreach (1-2, max. 2) NW**

Designed to help undergraduate majors acquire effective teaching skills at the college and public school level. Teaching experience gained through assisting graduate student teaching assistant or K-12 public school outreach. Involves classroom teaching experience and improving communications and presentation skills.

ESS 495 NASA Science and Engineering Research Seminar (1, max. 4) NW

Review of current space science-related research. Emphasis varies, but topics may include planetary geology, astronomy, global change, aeronautical engineering, and remote sensing. Credit/no credit only.

ESS 498 Undergraduate Thesis (5) NW

The thesis must be submitted at least one month before graduation.

ESS 499 Undergraduate Research (* max. 15).

ESS 502 The Solid Earth (3) Concepts of internal earth processes: Earth as heat engine and chemical processor, style of mantle convection, origin and evolution of the Earth's magnetic field, Cascadia subduction and hazards. Introduces seismology, fluid dynamics, heat flow, gravity, and geomagnetism. Focuses on the analysis, critique, and communication of ideas from scientific literature.

ESS 511 Geophysical Continuum Mechanics (3)

Analysis of stress and strain. Measurement and interpretation of strain in geological materials. Elasticity applied to determine stress in the earth's lithosphere. Creep of solids and flow of geological materials. Includes advanced, research-oriented problems. Prerequisite: MATH 307 and MATH 308 or equivalent.

ESS 512 Seismology (3)

Theoretical and observational seismology. Elastic plane wave propagation through stratified media. Surface waves, eigenvibrations, ray theory. Structure of Earth's mantle and core. Seismicity distributions, earthquake focal mechanisms and relationship to tectonics. Advanced, research-oriented problems. Prerequisite: ESS 511; recommended: concurrent registration in ESS 466.

ESS 513 Geophysics: The Earth (3)

Study of gravity, magnetism, heat flow, seismology. Earth's outer structure studied through unifying concepts of plate tectonic theory. Quantitative approaches to problems, using techniques of classical physics. Includes advanced, research-oriented problems. Prerequisite: ESS 512; PHYS 322.

ESS 514 Geophysics: Fluids (3)

Geophysical fluid dynamics. Fluids in geophysics with emphasis on the oceans. Development of the equations of motion with examples drawn from oceanography and solid earth geophysics. Includes advanced, research-oriented problems. Prerequisite: PHYS 322, MATH 307 and MATH 308 or equivalent.

ESS 515 Geophysics: Space (3)

Various phenomena occurring in outer regions of Earth's atmosphere, ionosphere, magnetosphere, and Van Allen radiation belts. Laboratory applications include plasma thrusters and fusion. Concepts include charged particles in magnetic fields, drift motion, plasma, magnetohydrodynamic waves. Includes advanced, research-oriented problems. Prerequisite: PHYS 321 or equivalent.

ESS 516 Geophysics: The Atmosphere (3)

Phenomena of the lower atmosphere: some simple applications of the principles of classical thermodynamics, fluid dynamics, and radiative transfer to the atmospheric hydrological cycle, global energy balance, and atmospheric dynamics and climate. Includes advanced, research-oriented problems. Prerequisite: ESS 514.

ESS 517 Early Earth Evolution (3)

Geological, biological, and environmental evolution of the Earth over the first 4 billion years of its history, as an analogue for the development of other habitable planets.

ESS 521 Remote Sensing of the Atmosphere and Climate System (3)

Satellite systems for sensing the atmosphere and climate system. Recovery of atmospheric and surface information from satellite radiance measurements. Applications for research. Prerequisite: ESS 571; ESS 572. Offered: jointly with ATM S 534.

ESS 522 Geophysical Data Collection and Analysis (3)

Theory and practical application of data collection and analysis applied to geophysical problems. Digital processing of signals; filtering and spectral analysis. Laboratory sessions include problem solving on computer-based processing system.

ESS 523 Geophysical Inverse Theory (3)

Introduction to the mathematical techniques for estimating properties of physical systems, such as the earth or atmosphere, from data that is insufficient for a precise specification of the system. Emphasis is on the concept of the resolving power of data sets. The ideas developed are quite general and have a wide range of applicability in the field of data interpretation. Prerequisite: ESS 522, or permission of instructor.

ESS 526 Sediment Dynamics and Boundary-Layer Physics (4)

Theoretical descriptions of sediment transport processes constrained by laboratory demonstrations. The physics of boundary layers, initiation of motion, suspended load, bedload, bedforms, and continua transport (turbidity currents, debris flows, and suspensions) and its application to the geological record. Offered: jointly with OCEAN 542.

ESS 527 Continental-Margin Sedimentation (3)

Detailed evaluation of recent studies into processes forming strata on continental margins, including the diverse time scales ranging from sediment transport to sequence stratigraphy. Highlights the linkages with physical oceanographic processes, the fates of geochemical components, and the relationship to biological communities. Offered: jointly with OCEAN 546.

ESS 528 Interpretation of Sedimentary Structures (2-4, max. 4)

Physical and environmental analysis of sedimentary structures, including biogenic sedimentary structures. Clastic sediments and rocks. Field trips required.

ESS 529 Principles of Fluid Dynamics, Heat, and Mass Transfer in Earth Sciences (3)

Introduction to the quantitative treatment of transport phenomena with applications to mantle and magma convection, volcanic eruptions, landslides, porous flow, and reaction. Emphasis on the governing equations of fluid dynamics including porous and multiple flow, chaotic convection, mixing, heat transfer, rheology, analytical, numerical, and scaling solutions.

ESS 531 Physics of Ice (3)

Structure of the water molecule. Crystallographic structures of ice. Electrical, optical, thermal, and mechanical properties of ice. Growth of ice from vapor and liquid phases. Prerequisite: permission of instructor. Offered: jointly with ATM S 510.

ESS 532 Formation of Snow and Ice Masses (3)

Snow and ice climatology. Formation of the ice crystals in clouds. Snow metamorphism. Transfer of radiative, sensible, and latent heat at snow and ice surfaces. Remote sensing of snow and ice. Growth and melt of sea ice. Climatic records from ice. Prerequisite: permission of instructor. Offered: jointly with ATM S 511.

ESS 533 Dynamics of Snow and Ice Masses (3)

Rheology of snow and ice. Sliding and processes at glacier beds. Thermal regime and motion of seasonal snow, glaciers, and ice sheets. Avalanches and glacier surges. Deformation and drift of sea ice. Response of natural ice masses to change in climate. Prerequisite: permission of instructor. Offered: jointly with ATM S 512.

ESS 534 Structural Glaciology (3)

Physical and chemical processes in snow, stratigraphy, and metamorphism. Interpretation of ice sheet stratigraphy in terms of paleoenvironment. Dynamic metamorphism of ice from flow. Structures formed at freezing interfaces. Structure of river, lake, and sea ice. Relationship between structures and bulk physical properties. Prerequisite: permission of instructor. Offered: jointly with ATM S 513.

ESS 535 Ice and Climate Modeling (3)

Principles of global climate modeling. Modeling seasonal cycles of snow cover and sea ice. Ice-sheet mass balance and flow. Solar radiation anomalies due to changes in earth's orbit. Climate/ice-sheet models of Pleistocene ice ages. Prerequisite: permission of instructor. Offered: jointly with ATM S 514.

ESS 537 Advanced Mineralogy (3)

Crystal symmetry: point groups, space groups. Mathematical description of crystal structures; group theory, irreducible representations; tensor description of physical properties: stress, strain, piezoelectricity, elasticity; structural and magnetic phase transitions, Landau theory, deformation

and creep crystals; elasto-viscous properties of earth's mantle, crystal chemistry, solid state reactions. Offered: jointly with MSE 518.

ESS 538 Petrogenesis of Igneous Rocks (3) Origin of one or more of the major groups of igneous rocks. Selected petrogenetic problems in light of tectonic setting, petrography, geochemistry, and experimental studies. Prerequisite: ESS 439 or equivalent.

ESS 540 Advanced Igneous Petrology (4) Crystal-liquid-vapor equilibria in magmatic systems. Physical properties of silicate melts. Geothermometry and geobarometry in igneous rocks. Models of fractionation, assimilation, and magma mixing. Trace elements, radiogenic isotopes, and stable isotopes as tracers in magmatic processes. Nucleation, crystal growth, and diffusion in melts. Prerequisite: ESS 312; ESS 439.

ESS 545 Economic Geology of Sedimentary Rocks (5) Description and origin of metallic and nonmetallic ore deposits indigenous to regoliths, sediments, and sedimentary rocks. Prerequisite: ESS 445, or equivalent or permission of instructor.

ESS 548 Geodynamics (3) Advanced study of various aspects of the dynamics of the solid Earth. Topics may include plate tectonics, mantle convection, rotational dynamics, post-glacial rebound, fault mechanics, and geodetic measurement of crustal deformation.

ESS 549 Geomagnetism (3) Advanced aspects of earth magnetism intended for specialists in this field. Extensive discussion of origin theories and their implications; physical basis and theories of magnetism in rocks; paleomagnetic techniques and results. Prerequisite: permission of instructor.

ESS 550 Electromagnetic and Potential Field Methods (3) Development of equations of electromagnetic fields in conducting media. Solution of forward and inverse problems with natural and controlled sources: magnetotelloric and related methods. Includes the special case of static fields: DC resistivity, gravity, and magnetic interpretation. Prerequisite: either ESS 413, or ESS 513, ESS 522, PHYS 323; or permission of instructor.

ESS 551 Mineral Physics (3) Applications of solid-state physics to various geophysical problems. Topics vary, but usually include the thermal properties of relevant geophysical materials, the equation of state for the earth's mantle and core, defects in solids and their roles in tectonophysics. Prerequisite: permission of instructor. Offered: alternate years.

ESS 552 Solution Geochemistry (4) Solution chemistry and thermodynamics as applied to solid and liquid silicates and aqueous fluids. Modeling configurational entropies in solids, activity coefficients and complexes in aqueous solution, and modeling chemical mass transfer in geologic systems. Prerequisite: ESS 312, or equivalent.

ESS 553 Electron Beam Microanalysis (4) Materials analysis using electron beams, including electron-target interactions, wave and energy dispersive x-ray analysis, scanning electron microscopy, and applications of these and related techniques to geological problems.

ESS 555 Physics and Chemistry of the Earth's Interior (3) Emphasizes current issues in global

tectonics and mantle dynamics. Examples include global seismic tomography and its bearing on geodynamics, the fate of subducted lithosphere and geochemical constraints on mantle convection. Prerequisite: permission of instructor.

ESS 556 Physical Petrology (3) The quantitative treatment of magmatic processes: thermo-mechanical state of the lithosphere, solidification, convection, conjugate heat transfer, crystal settling, magma mixing, diapirism and melt extraction, hydrothermal convection. Emphasis on continental lithosphere. Prerequisite: permission of instructor.

ESS 560 Cosmogenic Nuclides in Geomorphology (3) NW Use of cosmic-ray-produced nuclides to date rock surfaces and analyze geomorphic processes. Nuclide production by cosmic radiation above and below ground; tracer methods; exposure dating; coupling of cosmogenic nuclide data to geomorphic models. Prerequisite: either AMATH 301, AMATH 351, or permission of instructor.

ESS 562 Observational Seismology (1, max. 18) Quarterly research themes introduce students to a variety of digital and analog seismograms and techniques for their interpretation. Students present results of short investigations in an informal seminar setting. Credit/no credit only. Prerequisite: either ESS 412, ESS 512, or permission of instructor.

ESS 563 Theoretical Seismology I (3) Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: either ESS 412, ESS 512, or permission of instructor.

ESS 564 Theoretical Seismology II (3) Advanced theoretical seismology. Attenuation and physical dispersion. Waves in anisotropic media. Moment-tensor source representation. Lamb's problem. Waves in stratified media: propagator methods, asymptotic ray theory, WKBJ seismograms. Inverse methods and analysis of seismological data. Prerequisite: ESS 563.

ESS 565 Low-Frequency Seismology (3) Represent seismic displacement field, including surface and body waves, as superposition of normal modes. Rigorous development of equations of motion, their solution, energy integrals, Rayleigh's Principle, perturbation theory, attenuation, and excitation formulae. Moment-tensor representation of seismic sources. Prerequisite: either ESS 412, ESS 512, or permission of instructor.

ESS 568 Physics of the Oceanic Lithosphere (3) Basic principles of elasticity, fluid flow, and heat transport with specific applications to the formation and evolution of the oceanic lithosphere. Includes deformation of the earth, flow in porous media, heat transport, and marine seismological and potential field techniques. Prerequisite: OCEAN 540. Offered: jointly with OCEAN 545.

ESS 571 Atmospheric Radiation: Introductory (3) Fundamentals of radiative transfer; absorption and scattering by atmospheric gases; elementary applications to constraints on the

thermal structure, photochemistry, and remote sensing. Prerequisite: PHYS 225 or permission of instructor. Offered: jointly with ATM S 532.

ESS 572 Atmospheric Radiation: Advanced (3) Optical properties and particle absorption and scattering; solutions of radiative transfer equation in multiple scattering atmospheres applications to atmospheric and surface energy balance and remote sensing. Prerequisite: ATM S 532/ESS 571 or permission of instructor. Offered: jointly with ATM S 533.

ESS 573 Cloud Microphysics and Dynamics (3) Basic concepts of cloud microphysics, water continuity in clouds, cloud dynamics, and cloud models. Prerequisite: ATM S 501 or permission of instructor. Offered: jointly with ATM S 535.

ESS 574 Atmospheric Electrical Dynamics (3) Global and local dynamic electric field models, including upper atmospheric and tropospheric sources as modified by propagation delays, orographic features, and transient phenomena. Radiation and plasma waves along with microphysics of corona discharge and charge separation mechanisms. Prerequisite: ESS 415; ESS 416; or permission of instructor.

ESS 576 Space and Laboratory Plasma Physics (3) Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: ESS 415, or equivalent or permission of instructor. Offered: jointly with A A 556.

ESS 577 Advanced Space Plasma Physics (3) Formation by the interaction of solar wind with geomagnetic field. Trapped particles. Electromagnetic waves in anisotropic plasma. Dynamic disturbances and plasma instabilities. Prerequisite: ESS 415, or permission of instructor.

ESS 578 Kinetic Theory and Simulation of Space Plasmas (3) Wave-particle interactions in space plasmas. Generation of different wave modes, electrostatic and electromagnetic, Langmuir waves to Alfvén waves. Beam, Weibel, and maser instabilities, heavy ion interactions. Particle simulations, electrostatic and electromagnetic, for non-linear wave evolution and particle heating.

ESS 579 Computational Methods and Modeling in Geophysics I (3) Solution of complex dispersion equations including multiple root finding. Data analysis, fitting, smoothing, fast integration. Ray tracing and particle tracking in 2-D and 3-D. Computer simulation of fluid interactions, unmagnetized and magnetized, compressible and incompressible, and flow around objects.

ESS 581 Planetary Atmospheres (3) Problems of origin, evolution, and structure of planetary atmospheres, emphasizing elements common to all planetary atmospheres; roles of radiation, chemistry, and dynamic processes; new results on the atmospheres of Venus, Mars, Jupiter, and other solar-system objects in the context of comparative planetology. Offered: jointly with ASTR 555/ATM S 555.

ESS 583 Origin of the Solar System (3) Nebular and nonnebular theories of the origin of the solar system; collapse from the interstellar medium, grain growth in the solar nebula, formation of planetesimals and planets, early evolution of the planets and other possible planetary systems; examination of the physical

and chemical evidence upon which the ideas concerning the origin of the solar system are based. Offered: jointly with ASTR 557.

ESS 585 Climate Impacts on the Pacific Northwest (4) Knowledge of past/future patterns of climate to improve Pacific Northwest resource management. Topics include the predictability of natural/human-caused climate changes; past societal reactions to climate impacts on water, fish, forest, and coastal resources; how climate and public policies interact to affect ecosystems and society. Offered: jointly with ATM S/ENVIR/SMA 585.

ESS 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ATM S 586/OCEAN 586.

ESS 587 Climate Dynamics (3) Examines Earth's climate system; distribution of temperature, precipitation, wind ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly with ATM S 587/OCEAN 587.

ESS 588 The Global Carbon Cycle and Climate (3) Oceanic and terrestrial biogeochemical processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with ATM S 588/OCEAN 588.

ESS 589 Paleoclimatology: Data, Modeling and Theory (3) Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ATM S 589/OCEAN 589.

ESS 590 Special Topics (2-10, max. 20) .

ESS 594 Introduction to Earth and Space Sciences Research (1-2, max. 4) Introduces research of faculty and advanced graduate students to first-year graduate students and provides experience for the formulation, oral presentation, and defense of research proposals and results.

ESS 595 Earth and Space Sciences Research Methods (2, max. 12) Current research methodology and results based on recent literature and on faculty and student research. Designed to develop student perspective on observational and theoretical methods and on relation of specific research to broader developments in geophysics and interdisciplinary aspects of geophysics through faculty-guided presentations and discussion by students.

ESS 599 Seminar (1, max. 15) Review of current literature in geophysics and graduate student research with faculty participation. Credit/no credit only.

ESS 600 Independent Study or Research (*)
Credit/no credit only.

ESS 700 Master's Thesis (*) .

ESS 800 Doctoral Dissertation (*) .

Economics

ECON 100 Principles of Economics (5) I&S, QSR Fundamental concepts of economic analysis with application to contemporary problems. Cannot be taken for credit if 200 or 201 previously taken.

ECON 150 Quantitative Preparation for Economics and Business (5) NW, QSR Introduces students to the kinds of quantitative analysis used in economics and business courses. Uses practical examples to build skills in graphical analysis, use of algebra, basic probability, introductory computer use, and quantitative reasoning.

ECON 200 Introduction to Microeconomics (5) I&S, QSR Analysis of markets: consumer demand, production, exchange, the price system, resource allocation, government intervention. Recommended: MATH 111. Offered: AWSpS.

ECON 201 Introduction to Macroeconomics (5) I&S, QSR Analysis of the aggregate economy: national income, inflation, business fluctuations, unemployment, monetary system, federal budget, international trade and finance. Prerequisite: ECON 200; recommended: MATH 111. Offered: AWSpS.

ECON 235 Introduction to Environmental Economics (5) I&S/NW Introduces non-economics majors to environmental and natural resource economics. Discussion of fundamental economic concepts, including markets and private property. Students learn basic tools used in the economic assessment of environmental problems and apply these methods to key environmental issues. Offered: jointly with ENVIR 235.

ECON 299 Study Abroad: Economics (5, max. 10) I&S For participants in the Study Abroad program. Specific course content determined by assigned faculty member and announced in Study Abroad bulletins.

ECON 300 Intermediate Microeconomics (5) I&S Analysis of decisions by individuals and by firms and of outcomes in factor and product markets. Policy issues and applications. Prerequisite: ECON 200; either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145. Offered: AWSpS.

ECON 301 Intermediate Macroeconomics (5) I&S Analysis of the determinants of the aggregate level of employment, output, prices, and income of an economy. Policy issues and applications with special reference to current monetary and fiscal policy. Prerequisite: 2.0 in ECON 201; 2.0 in ECON 300. Offered: AWSpS.

ECON 306 Topics in Economics (1-5, max. 10) I&S Provides undergraduates the opportunity to apply tools learned in introductory economics courses to topics of interest outside the standard curriculum. Topics vary. Prerequisite: ECON 201.

ECON 399 Economics Internship (1-5, max. 10) Academic work completed in conjunction with an economics-related internship. Faculty

supervision required. Does not apply toward major.

ECON 400 Advanced Topics in Microeconomics (5) NW Application of calculus to microeconomics. Development of comparative statics used in production and consumption theory, including derivation of the Slutsky equation and duality results. Prerequisite: 2.0 in ECON 300; either MATH 124, MATH 127, MATH 134, or MATH 145; recommended: MATH 126 and 2.5 in ECON 300.

ECON 401 Advanced Topics in Macroeconomics (5) NW Application of mathematics to macroeconomics. Possible topics include economic dynamics and growth, rational expectations, real business cycle models, and New Keynesian approach. Prerequisite: 2.0 in ECON 301; either MATH 126, MATH 129, or MATH 136; recommended: 2.5 in ECON 301.

ECON 402 Microeconomics: Methods and Applications (5) I&S Generalizations and extensions of the course models of competition and monopoly taught in ECON 300. Topics include: factor markets and effects of monopoly power; game theory and oligopoly theory; decision making over time; uncertainty and under asymmetric information; contracts and incentives. Prerequisite: 2.0 in ECON 300.

ECON 403 The Economics of Property Rights (5) I&S Property rights as an economic concept. Delineation of rights as a subject of optimization. Formation of contracts to maximize the value of personal property. Formation of organizations to induce efficient use of resources and minimize losses to public domain. Prerequisite: 2.0 in ECON 300; recommended: two 400-level microeconomics classes.

ECON 404 Industrial Organization and Price Analysis (5) I&S Analysis of firm behavior in imperfectly competitive markets. Topics include monopoly, oligopoly, product differentiation, entry deterrence, and the role of asymmetric information. Game theoretic tools and empirical evidence used to analyze topics. Prerequisite: ECON 300.

ECON 406 Undergraduate Seminar in Economics (5, max. 10) I&S Provides undergraduate student an opportunity to apply the tools of economic analysis in a critical examination of theoretical and empirical work. A list of topics is available in the departmental office. Prerequisite: ECON 200.

ECON 407 Development of Economic Thought (5) I&S From the early modern period to the present. The main subjects treated are Adam Smith and the classical school, Karl Marx, the neoclassical reformulation and its critics, the impact of J. M. Keynes, and the evolution of economics in the twentieth century. Prerequisite: 2.0 in ECON 300.

ECON 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with POL S 409.

ECON 421 Money, Credit, and the Economy (5) I&S Role of money and the banking system in the United States economy. Relation of money to

inflation, interest rates, and business fluctuations. Monetary policy and Federal Reserve System. Prerequisite: 2.0 in ECON 301.

ECON 422 Investment, Capital, and Finance (5) I&S Intertemporal optimization: consumption and portfolio allocation decisions of households, investment and financing decisions of firms. Introduction to financial decisions under uncertainty. Portfolio theory, asset pricing, options, and futures. Financial market institutions and efficiency. Prerequisite: 2.0 in ECON 300; either ECON 311, STAT 311, MATH 390, STAT 390, or QMETH 201.

ECON 423 Topics in Financial Economics (5) I&S Topics of current interest such as regulation of securities markets and valuation of stocks. Allows students to apply tools of economics to real world problems in finance. Prerequisite: 2.0 in ECON 301; ACCTG 215. Offered: AWSpS.

ECON 424 Computational Finance and Financial Econometrics (5) NW Covers probability models, data analysis, quantitative, and statistical methods using applications in finance. Prerequisite: 2.0 in ECON 301; either ECON/STAT 311, STAT 341, MATH/STAT 390, or QMETH 300; either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145. Offered: AWSpS.

ECON 431 Government and Business (5) I&S Economic effects of various governmental regulatory agencies and policies. Antitrust legislation as a means of promoting desired market performance. Observed economic effects of policies intended to regulate business practices, control prices, conserve resources, or promote competition. Prerequisite: 2.0 in ECON 300.

ECON 435 Natural Resource Economics (5) I&S Survey of the economics of renewable and nonrenewable resources including fisheries, forest, minerals, and fuels. Optimal trade-offs between benefits and costs of resource use, including trade-offs between current and future use. Effects of property rights on resource use. Prerequisite: ECON 300.

ECON 436 Economics of the Environment (5) I&S Microeconomic analysis of environmental regulation. The problem of social cost, policy instrument choice, enforcement of regulations, methods for damage assessment, and estimating benefits of environmental improvement. Prerequisite: 2.0 in ECON 300.

ECON 437 Economics of Biological Resources (5) I&S Application of economic concepts to biology and biological concepts to economics. Examination of theory of species maximization, parallels in behavior between humans and other biota, animal choices among alternative food sources, games animals play, evidence of risk aversion in animals. Prerequisite: 2.0 in ECON 300.

ECON 442 Economics of Human Resource Management (5) I&S Analyzes the relationship between personnel practices and organizational performance. Economic analysis of compensation policy emphasized. Topics include hiring and retention strategies; incentive pay; relative performance evaluation; teams; promotions; seniority; and organization design. Examines human capital accumulation and labor legislation. Prerequisite: minimum grade of 2.0 in ECON 300.

ECON 443 Labor Market Analysis (5) I&S Determinants of employment and incomes in the United States: analysis of individual and firm decisions and of equilibrium in the labor market. Topics include decisions to work and retire, education and occupation choices, compensation, discrimination, poverty, unemployment and unions. Examination of policy issues affecting the labor market. Prerequisite: 2.0 in ECON 300.

ECON 444 Topics in Labor Market Analysis (5) I&S In-depth analysis of special topics in the operation of labor markets and public policies affecting incomes and employment. Course content varies by instructor. Prerequisite: 2.0 in ECON 300.

ECON 446 Economics of Education (5) I&S Examines formal education as an investment industry, the economics of human capital investment, and competition among government owned schools and the non-profit sector. Prerequisite: 2.0 in ECON 300. Offered: AWSpS.

ECON 447 Economics of Gender (5) I&S Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: 2.0 in ECON 300. Offered: jointly with WOMEN 447.

ECON 448 Population and Development (5) I&S Survey of topics in population economics, including history of thought, demographic experience of currently developing countries, household production models, fertility demand, quantity-quality models of fertility, mortality, health and nutrition, migration, macroeconomic-demographic linkages. Prerequisite: 2.0 in ECON 300.

ECON 450 Public Finance: Expenditure Policy (5) I&S Application of normative microeconomic theory to analysis of government expenditures. Rationale for government economic activity, collective choice, public goods, and externalities, income redistribution, public sector pricing, and specific expenditure programs. Prerequisite: 2.0 in ECON 300.

ECON 451 Public Finance: Tax Policy (5) I&S Microeconomics of taxation: efficiency, incidence, effect on distribution of income, personal and corporate income taxes, sales and consumption taxes, taxation of property and estates. Prerequisite: 2.0 in ECON 300.

ECON 454 Cost-Benefit Analysis (5) I&S Theory and practice of cost-benefit analysis of public sector projects and policies. Welfare criteria, investment criteria, shadow prices, social discount rate, marginal-willingness-to-pay for non-market goods, social risk, and special topics. Prerequisite: 2.0 in ECON 300.

ECON 455 Microeconomics of Public Policy (5) I&S Topics include general equilibrium analysis of efficiency and equity, income and substitution effects, analysis of alternative welfare programs, intergovernmental grants, price discrimination, price controls, rationing, industry regulation, and public goods. Prerequisite: 2.0 in ECON 300.

ECON 460 Economic History of Europe (5) I&S Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the

preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with HIST 481.

ECON 462 Economic History of the United States to the Civil War (5) I&S Systematic study of the changing pre-Civil War economic conditions and the consequences of these changes for the American society. Prerequisite: ECON 201.

ECON 463 Economic History of the United States From the Civil War to the Present (5) I&S Systematic study of the changing economic conditions since the Civil War and the consequences of these changes for the American society. Prerequisite: ECON 201.

ECON 464 Financial Crisis (5) I&S Causes, effects, and cures for financial crisis traced through history from the Tulip Bubble, to the Great Depression, to the East Asian Crisis of 1997, and beyond. Explores the original work of Fisher, Keynes, Friedman, and Krugman, among others. Prerequisite: 2.0 in ECON 301. Offered: AWSpS.

ECON 468 China's Economic Reforms-Integration Into World Economy (5) I&S Systematic survey of China's economic reforms since 1978, including China's increasing integration into the world economy. Prerequisite: ECON 201. Offered: jointly with SISEA 468.

ECON 471 International Trade (5) I&S Theory of comparative advantage and different models of international trade. Trade and welfare. Factor mobility and trade flows. Economic integration. Theory and practice of commercial policy. Prerequisite: 2.0 in ECON 301.

ECON 472 International Macroeconomics (5) I&S International monetary theory and open economy macroeconomics. Balance of payments and foreign exchange markets. Different exchange rate arrangements and their adjustment mechanisms. Money and international capital movements. Policy issues. The international monetary system. Prerequisite: 2.0 in ECON 301.

ECON 473 Topics in International Trade (5) I&S Advanced theory of trade and analysis of government trade policies. International trade and factor mobility. Theory of commercial policy. Prerequisite: 2.0 in ECON 301; ECON 471.

ECON 475 Economics of the European Union (5) I&S Analysis of economic issues relating to the European union. Explores the institutional aspects, the attempt to coordinate social and economic policies-welfare, employment, commercial, fiscal, and monetary-and the economic linkages between the European Union and the rest of the world. Prerequisite: 2.0 in ECON 301.

ECON 481 Introduction to Mathematical Statistics (5) NW Probability, generating functions; the d-method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 136 or MATH 126 with either MATH 308 or MATH 309. Recommended: MATH 324. Offered: jointly with CS&SS/STAT 481; A.

ECON 482 Econometric Methods (5) NW Application of statistical modeling to empirical

work in economics. A mixture of theory and applied computer work. Primary focus is regression analysis. Prerequisite: 2.0 in ECON 300; either ECON 311/STAT 311 or MATH 390/STAT 390.

ECON 483 Applied Econometric Modeling (5) NW Provides undergraduates the opportunity to learn econometric model building for a particular problem while applying the theory learned in various courses to specific economic cases. Students estimate, test, and forecast economic models. Extensive use of the computer and econometric programs. Prerequisite: 2.0 in ECON 301; either ECON/STAT 311, STAT 341, MATH/STAT 390, or QMETH 300; either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145.

ECON 485 Game Theory with Applications to Economics (5) NW Introduction to the main concepts of game theory: strategy, solution concepts for games, strategic behavior, commitment, cooperation, and incentives. Application to economics oligopoly theory, bargaining theory, and contract theory. Prerequisite: either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145; recommended: ECON 300; ECON 404.

ECON 486 Economics of Information (5) I&S, QSR *Khalil, Lawarree* Basic models of decision making and strategic interaction in the presence of imperfect and incomplete information. Information issues in market exchange and in hierarchical settings. Includes adverse selection, moral hazard, signaling, and screening. Recommended: ECON 404 or ECON 485. Prerequisite: 2.0 in ECON 300.

ECON 490 Comparative Economic Systems (5) I&S Study of resource allocation, growth, and income distribution in capitalist, market socialist, and centrally planned economies. Prerequisite: 2.0 in ECON 301.

ECON 491 Issues in Economic Development (5) I&S Examines factors contributing to the economic problems of developing countries and possible solutions. Theory and applications in economic development and international trade. Prerequisite: 2.0 in ECON 301.

ECON 492 Economic Issues of Contemporary Latin America (5) I&S Covers economic issues of current interest to policymakers in Latin America. Topic areas include trade policy, external capital flows to the region, macroeconomic instability, fiscal and monetary institutions, income inequality, and globalization. Prerequisite: minimum grade of 2.0 in ECON 301.

ECON 494 Economy of Japan (5) I&S Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with SISEA 494.

ECON 495 Economic Transformation of Russia and Eastern Europe (5) I&S Analytical survey of the economic institutions and economic structures of the transforming socialist economies. Socialist resource allocation. Market institutions. Structural change and the sequencing of economic reform. Primary focus on Russia and Eastern Europe. Prerequisite: 2.0 in ECON 301.

ECON 496 Honors Seminar (5) I&S Honors and other students in high standing have the

opportunity to develop research techniques, to pursue topics in breadth and depth, and to apply tools of economic analysis to selected topics in economic theory and current issues of national and international economic policy. For seniors only.

ECON 497 Honors Directed Study (5) Students write their honors thesis on the topic chosen in the Honors Seminar working under the previously arranged supervision of an economics faculty adviser. Prerequisite: ECON 496.

ECON 498 Senior Seminar (5) I&S Advanced undergraduate research in economics. Students formulate some underlying economic issue, organize its study, gather necessary information, and analyze results. Does not satisfy graduation requirement for the major. Prerequisite: ECON 301; one 400-level ECON course; recommended: two 400-level ECON courses.

ECON 499 Undergraduate Research (1-5, max. 10) May not be applied toward an advanced degree.

ECON 500 Microeconomic Analysis I (4) Duality and comparative statics analysis. Consumer and firm behavior. Uncertainty. Prerequisite: ECON 300.

ECON 501 Microeconomic Analysis II (4) General equilibrium and welfare economics. Introduction to game theory. Prerequisite: ECON 500.

ECON 502 Macroeconomic Analysis I (4) An introduction to advanced macroeconomics. Theories of income, employment, inflation, and growth. Prerequisite: ECON 300; ECON 301.

ECON 503 Macroeconomic Analysis II (4) Rational expectations in macroeconomic models. Dynamic optimizing models under uncertainty. Empirical examination of consumption, asset-pricing, and real business cycles.

ECON 505 Microeconomic Theory: Problems and Applications (3) Seminar for graduate students who have completed the basic core sequence in price theory. Designed to extend the student's analytic and problem-solving abilities by working systematically through a programmed set of readings and problems. The material includes both formal analytical techniques and applications of economic theory. Prerequisite: ECON 501.

ECON 507 History of Economic Thought (3) Classical and neoclassical economics with emphasis on alternative conceptions of the nature and significance of economic science.

ECON 508 Microeconomic Analysis III (4) Information economics. Prerequisite: ECON 500; ECON 501.

ECON 509 Macroeconomic Analysis III (4) Modern macroeconomic dynamics, presenting a range of approaches based on intertemporal optimization. Representative agent models with special emphasis on the analysis of government policy. More advanced discussion of economic growth. Prerequisite: ECON 502; ECON 503, or equivalent.

ECON 511 Advanced Microeconomic Theory: Selected Topics (3, max. 12) Seminar in advanced microtheory. Selected topics of special interest and significance. Prerequisite: ECON 500; ECON 501.

ECON 512 Advanced Macroeconomic Theory: Selected Topics (3, max. 12) Seminar in advanced macrotheory. Selected topics of special interest and significance.

ECON 513 Mathematical Economics: Linear Analysis (3) Theory and application of linear algebra and linear economic models. Prerequisite: ECON 300; MATH 126, or equivalent.

ECON 514 General Equilibrium Analysis (3) Study of the existence, uniqueness, and stability of general equilibrium models under the assumptions of competition. Emphasis is on recent developments in the literature with consideration given to both positive and normative economics.

ECON 515 Special Topics in Mathematical Economics (3, max. 12)

ECON 516 Introduction to Noncooperative Game Theory (3) Study of both pure game theory and its applications to such problems as oligopoly pricing, non-cooperative bargaining, entry deterrence, reputation phenomena. Focus on game theory as a modeling tool as opposed to a body of known results. Prerequisite: ECON 508.

ECON 518 Contract Theory (3) Basic contract theory models, including hidden action and hidden information models. Current developments in contract theory. Prerequisite: ECON 508; ECON 516 or permission of instructor.

ECON 519 Economics of Contracts and Organizations: Empirics (3) *Shi* Critically reviews empirical literature on contracts and organization. Topics include multi-tasking; incentives and risk sharing; relative and subjective performance evaluation; team production; tournament and promotion; efficiency wage; career concern; relational contracts; assess specificity and assess ownership; complexity, uncertainty, asset ownership; adverse selection. Prerequisite: ECON 518; ECON 582.

ECON 520 The Economics of Property Rights (3) Application of standard economic theory to analyze various forms of property rights as constraints of competition; the costs associated with delineation and enforcement of rights; the costs of negotiating and enforcing contracts for right transfers; resource allocation and income distribution implied by different property right and transaction cost constraints. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 523 Emergence of the State (3) Using tools of property rights, industrial organization, and game theory, explores the emergence of the state. Specifies conditions conducive to constitutional rule. Analyzes circumstances amenable to state-promoted exchange as opposed to self-enforced agreements. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 525 Computational Economics (3) *Sirakaya* Develops a basic understanding of computational techniques used in the economic literature. Demonstrates, with economic examples, when and how these techniques are used and why and how they work. Prerequisite: ECON 580; ECON 581; ECON 582.

ECON 527 Empirics and Theory in Macroeconomics (3) *Startz* Explores the integration of empirical and theoretical methods central to macroeconomic research. Exposes students to

frontier areas of research to help them learn substantive material and transition to conducting their own independent research. Prerequisite: ECON 502; ECON 503; ECON 509; ECON 581; ECON 582; recommended: ECON 584.

ECON 530 Government Regulation of Business (3) Public policy in the United States with respect to industrial organization and business conduct. Economic issues in antitrust policy emphasized. Prerequisite: ECON 500; ECON 501.

ECON 531 Theory of Industrial Organization I (3) Analysis of the monopolist's problem in different choice variables. Topics include the theory of the firm; pricing; choice of quality and advertising; price discrimination; and vertical control. Prerequisite: ECON 500; ECON 501.

ECON 532 Theory of Industrial Organization II (3) The application of game theory to problems of strategic behavior that arise in the study of imperfectly competitive markets. Topics include vertical integration, short- and long-run price competition, folk theorems, empirical tests of oligopoly pricing models, entry deterrence, research and development, and product differentiation. Prerequisite: ECON 500; ECON 501.

ECON 535 Natural Resource Economics (3) Half of integrated two-course sequence in environmental and natural resource economics. Dynamic optimization. Nonrenewable resource extraction and exploration, including effects of market structure, uncertainty, and taxation. Renewable resources, including fisheries and forests. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 536 Environmental Economics (3) Half of integrated two-course sequence in environmental and natural resource economics. Theory and methods of measuring environmental and resource values. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 537 Economic Aspects of Marine Policy (3) *Huppert* Development of pertinent economic concepts and their application to selected topics in marine policy decision making, including maritime policy, OCS oil and gas development, and wetlands management. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 537; W.

ECON 538 Economics of Living Marine Resources (3) *Huppert* Develops pertinent economic concepts and applications for conservation, regulation, and restoration of fisheries and other living resources. Gives special attention to fishery management, including harvest regulation and enforcement, recreational fisheries evaluation, property rights regimes, contemporary issues, and marine protected area management. Offered: jointly with SMA 538; Sp.

ECON 539 Economics of Natural Resources Seminar III (3) Selected advanced topics in the economics of natural resources and environmental regulation. Topics may include environmental regulation as a problem in optimal mechanism design, enforcement of regulations, regulatory regimes for common property resources, and the measurement of market power in nonrenewable resource industries. Prerequisite: ECON 536.

ECON 541 Labor Economics (3) Theoretical and empirical analysis of the labor market. The

determinants of labor supply and demand, human capital investment, the pattern of compensation, employment contracts and incentives, unemployment and labor market dynamics.

ECON 542 Labor Economics (3) Theoretical and empirical analysis of the labor market. The determinants of labor supply and demand, human capital investment, the pattern of compensation, employment contracts and incentives, unemployment and labor market dynamics.

ECON 543 Population Economics (3) Economic determinants and consequences of population growth; emphasis on formal theoretical models and on empirical analysis. Introduction to: formal demography; welfare economics of population change, including analyses of population effects on consumption, savings, investment, and technical change; and determinants of mortality, fertility, and migration. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 546 Health Economics (3) Theoretical and empirical models of the demand for health and health care; supply of health care from physicians and hospitals; government programs that subsidize health care; occupational health; cost-benefit analyses of preventive health care and new medical technologies. Prerequisite: graduate-level microeconomics, HSERV 585, or permission of instructor.

ECON 547 Health Policy Economics (3) Selected topics in health economics, including risk and insurance, medical malpractice, the market for physician services, and industry regulation. Prerequisite: a course in intermediate microeconomics or permission of instructor. Offered: jointly with HSERV 587.

ECON 550 Public Finance: Expenditure Policy (3) Theory of public finance with emphasis on public expenditures. Social welfare maximization, public goods and externalities, decreasing cost industries, theory of collective choice, second-best analysis. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 551 Public Finance: Tax Policy (3) Theory of public finance with emphasis on taxation. Second-best analysis, optimal taxation, general equilibrium incidence analysis, issues in personal income taxation and corporate income taxation. Prerequisite: ECON 500; ECON 501, or permission of instructor.

ECON 554 Cost-Benefit Analysis (3) Covers the theoretical foundations of cost-benefit analysis using graduate microeconomics. Stresses both the conceptual and practical problems encountered in the subject. Emphasis on problem solving and term project. Prerequisite: ECON 500; ECON 501.

ECON 571 International Trade Theory (3) Comparative advantage, resource allocation, income distribution, and foreign trade. Different theories of trade, with or without perfect competition and constant returns. International factor mobility. Prerequisite: ECON 500; ECON 501.

ECON 572 International Financial and Monetary Economics (3) Analysis of open economy macro models with emphasis on exchange rates and balance of payments

determination. Prerequisite: ECON 502; ECON 503.

ECON 573 International Commercial Policy (3) Analysis of welfare aspects of international trade and factor mobility. Costs and benefits of protection; implications of different government policies. Import competition and response. Prerequisite: ECON 571 or permission of instructor.

ECON 574 International Macroeconomics (3) Surveys recent developments in international macroeconomics, placing particular emphasis on the dynamic aspects. One sector, multisector, and two-country international models discussed. Fiscal issues treated in depth. Stochastic aspects introduced and related to the literature on international real business cycles. Prerequisite: ECON 509 or equivalent.

ECON 580 Econometrics I (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Students may receive credit for only one of MATH/STAT 390, ECON/STAT 481, and ECON 580.

ECON 581 Econometrics II (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 580.

ECON 582 Econometrics III (4) Methods, tools, and theory of econometrics as the basis for empirical investigation in economics. Specification, testing, and use of econometric models with reference to examples in the literature. Prerequisite: ECON 581.

ECON 583 Econometric Theory I (3) Estimation and testing in linear and nonlinear regression models. Asymptotic theory, bootstrapping. Theoretical developments are reinforced with a variety of empirical examples and applications. Prerequisite: ECON 580, ECON 581, ECON 582 or equivalent.

ECON 584 Econometric Theory II (3) Continuation of 583. Analysis of stationary and nonstationary, univariate, and multivariate time series models. Emphasis on empirical applications. Prerequisite: ECON 583.

ECON 585 Applied Microeconometrics (3) Econometric issues that arise in applied microeconomic research. Topics include the use of panel data and models with limited and qualitative dependent variables. Prerequisite: ECON 582 or equivalent.

ECON 586 Advanced Applied Time Series Analysis (3) Time series and empirical macroeconomics with focus on applications of time series analysis to various topics in macroeconomics and finance. Topics include: state-space models and Kalman filter; Markov-switching models and their extensions; Bayesian Gibbs sampling; randomization; and measurement of volatility.

ECON 590 Theory and Practice of Economic Planning (3) Analysis of incentives for, and methods of, government intervention in socialist and developing countries, with a focus on microeconomic issues.

ECON 591 Theoretical Issues in Economic Development (3) Analysis of issues in economic

development with application to the less-developed countries of the world today. Prerequisite: ECON 500, ECON 501, or permission of instructor.

ECON 592 Development Policy (3) Theoretical and empirical analysis of macroeconomic policies pursued by developing countries. Topics include the determination of exchange rates and relative prices in small economies; the examination of government spending, taxation, banking, trade, and labor market policies; and the evaluation of market-oriented economic reform programs. Prerequisite: ECON 503; recommended: ECON 591.

ECON 594 Economic Growth (3) *Turnovsky* Studies various theoretical approaches to the question of why some countries are richer than others using generalizations and extensions of contemporary macroeconomic theory. Discusses the implications of various macroeconomic policies for economic growth. Prerequisite: ECON 502; ECON 503; ECON 509.

ECON 595 Analysis of the Transforming Socialist Economies (3) Applications of economic analysis to the economic problems of transforming socialist economies. Economic institutions. The role of the state. Privatization and the behavior of decentralized organizations. Integration into the world market. Prerequisite: micro- and macroeconomic theory and permission of instructor.

ECON 596 Research Practicum in Microeconomics (1, max. 6) Provides opportunity to practice research and presentation skills in applied and theoretical microeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 597 Research Practicum in Macroeconomics (1, max. 6) Provides opportunity to practice research and presentation skills in applied and theoretical macroeconomics. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 598 Research Practicum in Labor and Development (1, max. 6) Provides opportunity to practice research and presentation skills in economics of labor and development. Students develop and refine thesis topics under faculty supervision. Peer criticism a significant part of participation requirement. Maximum of 6 credits allowed in 596, 597, and 598 combined. Credit/no credit only.

ECON 599 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Credit/no credit only. Offered: AWSp.

ECON 600 Independent Study or Research (*) Credit/no credit only.

ECON 601 Internship (1-9, max. 9) Credit/no credit only.

ECON 602 Teaching Introductory Economics

(1) Examines problems encountered in preparing and presenting courses in introductory economics. Credit/no credit only.

ECON 800 Doctoral Dissertation (*) Credit/no credit only.

English

ENGL 100 Intermediate ESL for Non-Native Speakers (5) Offered as three separate sections. Each language structure course focuses on the grammar and vocabulary necessary for academic reading and writing. Sections must be taken consecutively. Special fee required. Credits averaged in GPA but do not count toward graduation.

ENGL 101 Advanced ESL for Non-Native Speakers (5) Offered as two separate sections: one for writing about readings, particularly answering short answer and short essay questions; the other for listening skills related to academic lectures. Sections may be taken concurrently. Special fee required. Credits averaged in GPA but do not count toward graduation.

ENGL 102 Advanced ESL for International Teaching Assistants (5) Speaking skills for international teaching assistants: language behaviors related to lecturing, classroom management, and teacher-student interaction. Credits averaged in GPA but do not count toward graduation.

ENGL 103 Introduction to Writing for EOP/SSS Students (5) Development of writing skills necessary to produce college-level short and medium-length essays. Sequence of five essays designed to develop personal voice and competence in writing for academic disciplines.

ENGL 104 Introductory Composition (5-) C Development of writing skills: sentence strategies and paragraph structures. Expository, critical, and persuasive essay techniques based on analysis of selected readings. For Educational Opportunity Program students only, upon recommendation by the Office of Minority Affairs.

ENGL 105 Introductory Composition (-5) C Development of writing skills: sentence strategies and paragraph structures. Expository, critical, and persuasive essay techniques based on analysis of selected readings. For Educational Opportunity Program students only, upon recommendation by the Office of Minority Affairs.

ENGL 106 Practical Forms of Writing (5) C Instruction in writing essay examinations, reports, reviews, and research papers. For Educational Opportunity Program students only, upon recommendation by the Office of Minority Affairs.

ENGL 111 Composition: Literature (5) C Study and practice of good writing; topics derived from reading and discussing stories, poems, essays, and plays.

ENGL 121 Composition: Social Issues (5) C Study and practice of good writing; topics derived from reading and discussing essays and fiction about current social and moral issues.

ENGL 131 Composition: Exposition (5) C Study and practice of good writing: topics derived from a variety of personal, academic, and public subjects.

ENGL 182 The Research Paper (5) C Includes study of library resources, the analysis of reading materials, and writing preparatory papers as basic to writing a reference or research paper. Open to all undergraduates. Prerequisite: either ENGL 111, ENGL 121, or ENGL 131.

ENGL 197 Interdisciplinary Writing/Humanities (5, max. 15) C Expository writing based on material presented in a specified humanities lecture course. Assignments include drafts of papers to be submitted in the specified course, and other pieces of analytical prose. Concurrent registration in the specified course required.

ENGL 198 Interdisciplinary Writing/Social Science (5, max. 15) C Expository writing based on material presented in a specified social science lecture course. Assignments include drafts of papers to be submitted in the specified course, and other pieces of analytic prose. Concurrent registration in specified course required.

ENGL 199 Interdisciplinary Writing/Natural Science (5, max. 15) C Expository writing based on material presented in a specific natural science lecture course. Assignments include drafts of papers to be submitted in the specified course, and other pieces of analytical prose. Concurrent registration in the specified course required.

ENGL 200 Reading Literature (5) VLPA Techniques and practice in reading and enjoying literature. Examines some of the best works in English and American literature and considers such features of literary meaning as imagery, characterization, narration, and patterning in sound and sense. Emphasis on literature as a source of pleasure and knowledge about human experience.

ENGL 202 Introduction to the Study of English Language and Literature (5) Gateway course designed for English pre-majors and majors. Introduces critical, historical, and theoretical frameworks important to studying the literature, language, and cultures of English. Concurrent registration with ENGL 197 required. Offered: .

ENGL 205 Method, Imagination, and Inquiry (5) VLPA Examines ideas of method and imagination in a variety of texts, in literature, philosophy, and science. Particularly concerned with intellectual backgrounds and methods of inquiry that have shaped modern Western literature. Offered: jointly with CHID 205.

ENGL 207 Introduction to Cultural Studies (5) VLPA Asks three questions: What is Cultural Studies? How does one read from a Cultural Studies perspective? What is the value of reading this way? Provides historical understanding of Cultural Studies, its terms and its specific way of interpreting a variety of texts, i.e. literature, visual images, music, video, and performance.

ENGL 210 Literature and the Ancient World (5) VLPA Introduction to literature from a broadly cultural point of view, focusing on major works that have shaped the development of literary and intellectual traditions to the Middle Ages.

ENGL 211 Medieval and Renaissance Literature (5) VLPA Introduction to literature from a broadly cultural point of view, focusing on major works that have shaped the development of literary and intellectual traditions from the Middle Ages to the eighteenth century.

ENGL 212 Literature of Enlightenment and Revolution (5) VLPA Introduction to eighteenth- and nineteenth-century literature from a broadly cultural point of view, focusing on representative works that illustrate literary and intellectual developments of the period.

ENGL 213 Modern and Postmodern Literature (5) VLPA Introduction to twentieth-century literature from a broadly cultural point of view, focusing on representative works that illustrate literary and intellectual developments since 1900.

ENGL 225 Shakespeare (5) VLPA Survey of Shakespeare's career as dramatist. Study of representative comedies, tragedies, romances, and history plays.

ENGL 228 English Literary Culture: To 1600 (5) VLPA British literature from Middle Ages to end of sixteenth century. Study of literature in its cultural context, with attention to changes in language, form, content, and style.

ENGL 229 English Literary Culture: 1600-1800 (5) VLPA British literature in seventeenth and eighteenth centuries. Study of literature in its cultural context, with attention to changes in form, content, and style.

ENGL 230 English Literary Culture: After 1800 (5) VLPA British literature in the nineteenth and twentieth centuries. Study of literature in its cultural context, with attention to changes in form, content, and style.

ENGL 242 Reading Fiction (5) VLPA Critical interpretation and meaning in fiction. Different examples of fiction representing a variety of types from the medieval to modern periods.

ENGL 243 Reading Poetry (5) VLPA Critical interpretation and meaning in poems. Different examples of poetry representing a variety of types from the medieval to modern periods.

ENGL 244 Reading Drama (5) VLPA Critical interpretation and meaning in plays. Different examples of drama representing a variety of types from the medieval to modern periods.

ENGL 250 Introduction to American Literature (5) VLPA Survey of the major writers, modes, and themes in American literature, from the beginnings to the present. Specific readings vary, but often included are: Taylor, Edwards, Franklin, Poe, Hawthorne, Melville, Emerson, Thoreau, Whitman, Dickinson, Twain, James, Eliot, Stevens, O'Neill, Faulkner, Hemingway, Ellison, and Bellow.

ENGL 251 Introduction to American Political Culture (5) I&S/VLPA Introduction to the methods and theories used in the analysis of American culture. Emphasizes an interdisciplinary approach to American literature, including history, politics, anthropology, and mass media. Offered: jointly with POL S 281.

ENGL 257 Introduction to Asian-American Literature (5) VLPA Introductory survey of Asian-American literature provides introduction to Chinese, Japanese, Filipino, Korean, Hawaiian, South-Asian, and Southeast-Asian American literatures and a comparative study of the basic cultural histories of those Asian-American communities from the 1800s to the present.

ENGL 258 African-American Literature: 1745 to Present (5) VLPA A chronological survey of Afro-American literature in all genres from its

beginnings to the present day. Emphasizes Afro-American writing as a literary art; the cultural and historical context of Afro-American literary expression and the aesthetic criteria of Afro-American literature. Offered: jointly with AFRAM 214.

ENGL 264 Literature and Science (5) VLPA Explores the relationships between literature and science as ways of comprehending humanity's interaction with the world we inhabit. As a course in criticism, explores how literature and science structure and are structured by social, religious, political, and economic factors in culture.

ENGL 270 Cultural Issues in English (5) VLPA Survey of the assumptions, methodologies, and major issues of English in its cultural settings. Designed to connect English Language study with the study of literature, orality and literacy, education, ethnicity, gender, and public policy.

ENGL 281 Intermediate Expository Writing (5) C Writing papers communicating information and opinion to develop accurate, competent, and effective expression.

ENGL 282 Composing for the Web (5) Introduces the writing of nonfiction narrative and expository pieces for publication on the Web. Analysis and criticism of on-line work.

ENGL 283 Beginning Verse Writing (5) VLPA Intensive study of the ways and means of making a poem.

ENGL 284 Beginning Short Story Writing (5) VLPA Introduction to the theory and practice of writing the short story.

ENGL 300 Reading Major Texts (5) VLPA Intensive examination of one or a few major works of literature. Classroom work to develop skills of careful and critical reading. Book selection varies, but reading consists of major works by important authors and of selected supplementary materials.

ENGL 302 Critical Practice (5) VLPA Intensive study of, and exercise in, applying important or influential interpretive practices for studying language, literature, and culture, along with consideration of their powers/limits. Focuses on developing critical writing abilities. Topics vary and may include critical and interpretive practice from scripture and myth to more contemporary approaches, including newer interdisciplinary practices.

ENGL 303 History of Literary Criticism and Theory I (5) VLPA Literary criticism and theory from its beginnings in Plato through the early twentieth century. Philosophical and theoretical grounds for critical practice put forward by philosophers and critics.

ENGL 304 History of Literary Criticism and Theory II (5) VLPA Contemporary criticism and theory and its background in the New Criticism, structuralism, and phenomenology.

ENGL 305 Theories of Imagination (5) I&S/VLPA Survey of theories of imagination since the seventeenth century. Focuses on the uses of the concept in literature, criticism, science, and society.

ENGL 307 Cultural Studies: Literature and the Age (5) VLPA Problems of literary periodization. Works by major and minor authors in the context of cultural history; critical and theoretical

approaches that have led to the idea of periodization. Emphasis varies. Recommended: one 300-level ENGL course in the literary period being studied.

ENGL 310 The Bible as Literature (5) VLPA Introduction to the development of the religious ideas and institutions of ancient Israel, with selected readings from the Old Testament and New Testament. Emphasis on reading *The Bible* with literary and historical understanding.

ENGL 311 Modern Jewish Literature in Translation (5) VLPA Survey of Jewish experience and its literary expression since 1880. Includes such Yiddish writers as Sholom Aleichem, Peretz, and I. B. Singer; such Israeli writers as Agnon, Hazaz, and Appelfeld; and such writers in non-Jewish languages as Primo Levi and Kafka.

ENGL 312 Jewish Literature: Biblical to Modern (5) I&S/VLPA A study of Jewish literature from Biblical narrative and rabbinic commentary to modern prose and poetry with intervening texts primarily organized around major themes: martyrdom and suffering, destruction and exile, messianism, Hasidism and Enlightenment, Yiddishism and Zionism. Various critical approaches; geographic and historic contexts. Offered: jointly with SISJE 312.

ENGL 313 Modern European Literature in Translation (5) VLPA Fiction, poetry, and drama from the development of modernism to the present. Works by such writers as Mann, Proust, Kafka, Gide, Hesse, Rilke, Brecht, Sartre, and Camus.

ENGL 315 Literary Modernism (5) VLPA Various modern authors, from Wordsworth to the present, in relation to such major thinkers as Kant, Hegel, Darwin, Marx, Nietzsche, Bergson, and Wittgenstein, who have helped create the context and the content of modern literature. Recommended: ENGL 230 or one 300-level course in 19th or 20th century literature.

ENGL 316 Postcolonial Literature and Culture (5, max. 10) VLPA Readings of major texts and writers in postcolonial literature and culture. Surveys some of the most important questions and debates in postcolonial literature, including issues of identity, globalization, language, and nationalism. The cultural focus may vary, so students should check with the professor for specific details.

ENGL 317 Literature of the Americas (5) VLPA Examines writings by and about people of the Americas, with a focus on intersections of gender, colonialism, race, sexuality, and ethnicity.

ENGL 320 English Literature: The Middle Ages (5) VLPA Literary culture of Middle Ages in England, as seen in selected works from earlier and later periods, ages of *Beowulf* and of Geoffrey Chaucer. Read in translation, except for a few later works, which are read in Middle English.

ENGL 321 Chaucer (5) VLPA Chaucer's *Canterbury Tales* and other poetry, with attention to Chaucer's social, historical, and intellectual milieu.

ENGL 322 English Literature: The Age of Queen Elizabeth (5) VLPA The golden age of English poetry, with poems by Shakespeare, Spenser, Sidney, and others; drama by Marlowe and other early rivals to Shakespeare; prose by

Sir Thomas More and the great Elizabethan translators.

ENGL 323 Shakespeare to 1603 (5) VLPA Shakespeare's career as dramatist before 1603 (including *Hamlet*). Study of history plays, comedies, and tragedies.

ENGL 324 Shakespeare After 1603 (5) VLPA Shakespeare's career as dramatist after 1603. Study of comedies, tragedies, and romances.

ENGL 325 English Literature: The Late Renaissance (5) VLPA A period of skepticism for some, faith for others, but intellectual upheaval generally. Poems by John Donne and the "metaphysical" school; poems and plays by Ben Jonson and other late rivals to Shakespeare; prose by Sir Francis Bacon and other writers.

ENGL 326 Milton (5) VLPA Milton's early poems and the prose; *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*, with attention to the religious, intellectual, and literary contexts.

ENGL 327 English Literature: Restoration and Early Eighteenth Century (5) VLPA Selections from wits and satirists; poems by John Dryden and Alexander Pope; plays by Dryden, William Congreve, and other wits; the great satires of Jonathan Swift, and the first stirring of the novel.

ENGL 328 English Literature: Later Eighteenth Century (5) VLPA Classic age of English prose. Essays, biography, and criticism by Samuel Johnson, Oliver Goldsmith, and others; comedies by Goldsmith and Richard Brinsley Sheridan; fiction by Henry Fielding and others; poetry by a variety of writers.

ENGL 329 Rise of the English Novel (5) VLPA Study of the development of this major and popular modern literary form in the eighteenth century. Readings of the best of the novelists who founded the form, and some minor ones, from Defoe to Fielding, Richardson, and Sterne, early Austen, and the gothic and other writers.

ENGL 330 English Literature: The Romantic Age (5) VLPA Literary, intellectual, and historical ferment of the period from the French Revolution to the 1830s. Readings from major authors in different literary forms; discussions of critical and philosophical issues in a time of change.

ENGL 331 Romantic Poetry I (5) VLPA Blake, Wordsworth, Coleridge, and their contemporaries.

ENGL 332 Romantic Poetry II (5) VLPA Byron, Shelley, Keats, and their contemporaries.

ENGL 333 English Novel: Early and Middle Nineteenth Century (5) VLPA Studies in the novel in one of its classic phases. Authors include Austen, the Brontës, Dickens, Thackeray.

ENGL 334 English Novel: Later Nineteenth Century (5) VLPA Studies in the novel as it passes from a classic format to formats more experimental. Authors include George Eliot, Thomas Hardy, Joseph Conrad, and others.

ENGL 335 English Literature: The Age of Victoria (5) VLPA Literature in an era of revolution that also sought continuity, when culture faced redefinition as mass culture and found in the process new demands and creative energies, new material and forms, and transformations of old ones. Readings range from works of Tennyson, Browning, Arnold, Shaw, to Dickens, Eliot, Hardy.

ENGL 336 English Literature: The Early Modern Period (5) VLPA Experiments in fiction and poetry. Novels by Joyce, Woolf, Lawrence, and others; poetry by Eliot and Yeats and others.

ENGL 337 The Modern Novel (5) VLPA The novel on both sides of the Atlantic in the first half of the twentieth century. Includes such writers as Joyce, Woolf, Lawrence, Stein, Hemingway, Faulkner, and others.

ENGL 338 Modern Poetry (5) VLPA Poetry in the modernist mode, including such poets as Yeats, Eliot, Pound, Auden, and Moore.

ENGL 339 English Literature: Contemporary England (5) VLPA Return to more traditional forms in such writers as Bowen, Orwell, Waugh, Cary, Lessing, Drabble.

ENGL 340 Modern Anglo-Irish Literature (5) VLPA Principal writers in English of the modern Irish literary movement — Yeats, Joyce, Synge, Gregory, and O'Casey among them — with attention to traditions of Irish culture and history.

ENGL 342 Contemporary Novel (5) VLPA Recent efforts to change the shape and direction of the novel by such writers as Murdoch, Barth, Hawkes, Fowles, and Atwood.

ENGL 343 Contemporary Poetry (5) VLPA Recent developments by such poets as Hughes, Heaney, Rich, Kinnell, and Hugo.

ENGL 344 Twentieth-Century Dramatic Literature (5) VLPA Modern and contemporary plays by such writers as Shaw, Synge, O'Casey, O'Neill, Yeats, Eliot, Beckett, Pinter, and Albee.

ENGL 345 Studies in Film (5) VLPA Types, techniques, and issues explored by filmmakers. Emphasis on narrative, image, and point of view.

ENGL 346 Studies in Short Fiction (5) VLPA The American and English short story, with attention to the influence of writers of other cultures. Aspects of the short story that distinguish it, in style and purpose, from longer fiction.

ENGL 347 The Art of Prose (5) VLPA Techniques and varieties of prose — autobiography, biography, personal essay, reflective and meditative writing, social and scientific inquiry, and persuasive writing. Special attention to use of poetic, fictional, and dramatic devices. Recommended: one introductory literature course.

ENGL 348 Studies in Drama (5) VLPA Investigation of one of the major types of drama: tragedy or comedy. Emphasis on drama prior to the twentieth century.

ENGL 349 Science Fiction and Fantasy (5) VLPA The study of the development of and specific debates in the related genres of fantasy and science fiction literatures.

ENGL 350 Traditions in American Fiction (5) VLPA A literary form in which America has found its distinctively American expression. Selected readings among important novelists from the beginnings until 1900, including Cooper, Hawthorne, Melville, Twain, Chopin, James, and Wharton.

ENGL 351 American Literature: The Colonial Period (5) VLPA Responses to the New World and literary strategies in the literature of the

colonies and the early republic. Works by Taylor, Edwards, Franklin, and others.

ENGL 352 American Literature: The Early Nation (5) VLPA Conflicting visions of the national destiny and the individual identity in the early years of America's nationhood. Works by Emerson, Thoreau, Hawthorne, Melville, and such other writers as Poe, Cooper, Irving, Whitman, Dickinson, and Douglass.

ENGL 353 American Literature: Later Nineteenth Century (5) VLPA Literary responses to an America propelled forward by accelerating and complex forces. Works by Twain, James, and such other writers as Whitman, Dickinson, Adams, Wharton, Howells, Crane, Dreiser, DuBois, and Chopin.

ENGL 354 American Literature: The Early Modern Period (5) VLPA Literary responses to the disillusionment after World War I, experiments in form and in new ideas of a new period. Works by such writers as Anderson, Toomer, Cather, O'Neill, Frost, Pound, Eliot, Cummings, Hemingway, Fitzgerald, Faulkner, Stein, Hart Crane, Stevens, and Porter.

ENGL 355 American Literature: Contemporary America (5) VLPA Works by such writers as Ellison, Williams, O'Connor, Lowell, Barth, Rich, and Hawkes.

ENGL 356 Classic American Poetry (5) VLPA Poetry by Taylor, Whitman, Dickinson, and such others as Poe, Bradstreet, Crane, Robinson. The lineage and characteristics of lyric and epic in America.

ENGL 358 Literature of Black Americans (5) VLPA Selected writings, novels, short stories, plays, poems by Afro-American writers. Study of the historical and cultural context within which they evolved. Differences between Afro-American writers and writers of the European-American tradition. Emphasis varies. Offered: jointly with AFRAM 358.

ENGL 359 Contemporary American Indian Literature (5) VLPA Creative writings — novels, short stories, poems — of contemporary Indian authors; traditions out of which they evolved. Differences between Indian writers and writers of the dominant European/American mainstream. Offered: jointly with AIS 377.

ENGL 360 American Political Culture: To 1865 (5) I&S/VLPA American literature in its political and cultural context from the Puritan origins to the Civil War. Emphasizes an interdisciplinary approach to American literature, including history, politics, anthropology, and mass media.

ENGL 361 American Political Culture: After 1865 (5) I&S/VLPA American literature in its political and cultural context from the Civil War to the present. Emphasizes an interdisciplinary approach to American literature, including history, politics, anthropology, and mass media.

ENGL 363 Literature and the Other Arts and Disciplines (5, max. 10) VLPA Relationships between literature and other arts, such as painting, photography, architecture, and music, or between literature and other disciplines, such as science. Content varies.

ENGL 364 Literature and Medicine (5) I&S/VLPA How changing concepts of doctor-patient relationship and of body depicted in literary texts affect decisions throughout the human life cycle.

Medicine and disease as metaphors for personal experience and social analysis.

ENGL 367 Gender Studies in Literature (5, max. 15) VLPA The study of contemporary approaches to analyzing the gender politics of literature and culture. Examines special topics in the history and development of the major theoretical trends, including the relationship of certain theories of gender to relevant works of literature.

ENGL 368 Women Writers (5, max. 15) VLPA Study of the work of women writers in English and American literature.

ENGL 370 English Language Study (5) VLPA Wide-range introduction to the study of written and spoken English. The nature of language; ways of describing language; the use of language study as an approach to English literature and the teaching of English.

ENGL 371 English Syntax (5) VLPA Description of sentence, phrase, and word structures in present-day English. Prerequisite: either ENGL 370 or LING 200.

ENGL 372 Language Variation in Current English (5) VLPA Examination of geographical, social, and occupational varieties of American English. Relationship between societal attitudes and language use.

ENGL 373 History of the English Language (5) VLPA Evolution of English sounds, forms, structures, and word meanings from Anglo-Saxon times to the present. Prerequisite: either ENGL 370 or LING 200.

ENGL 374 The Language of Literature (5) VLPA Roles of explicitly describable language features in the understanding and appreciation of various verbal forms. Emphasis on literature, but attention also may be given to nonliterary prose and oral forms.

ENGL 381 Advanced Expository Writing (5) VLPA Concentration on the development of prose style for experienced writers.

ENGL 382 Writing for the Web (5) C Writing substantial Web essays on topics of current concern. Extensive analysis and criticism of on-line essays. Prerequisite: ENGL 282.

ENGL 383 The Craft of Verse (5) VLPA Intensive study of various aspects of the craft verse. Readings in contemporary verse and writing using emulation and imitation. Prerequisite: ENGL 283; ENGL 284.

ENGL 384 The Craft of Prose (5) VLPA Intensive study of various aspects of the craft of fiction or creative nonfiction. Readings in contemporary prose and writing using emulation and imitation. Prerequisite: ENGL 283; ENGL 284.

ENGL 407 Special Topics in Cultural Studies (5) VLPA Advanced work in cultural studies.

ENGL 411 Introduction to the Folktale Among Literate Peoples (3) VLPA Techniques of classification, geographic-historical distribution, theories of origin and interpretations, and related areas of investigation of the oral prose folk narrative of literate peoples.

ENGL 422 Arthurian Legends (5) VLPA Medieval romance in its cultural and historical

setting, with concentration on the evolution of Arthurian romance.

ENGL 430 British Writers: Studies in Major Authors (5, max. 15) VLPA Concentration on one writer or a special group of British writers.

ENGL 431 Topics in British Literature (5, max. 15) VLPA Themes and topics of special meaning to British literature.

ENGL 440 Special Studies in Literature (3/5, max. 10) VLPA Themes and topics offering special approaches to literature.

ENGL 442 The Novel: Special Studies (5, max. 10) VLPA Readings may be English or American and drawn from different periods, or they may concentrate on different types — gothic, experimental, novel of consciousness, realistic novel. Special attention to the novel as a distinct literary form. Specific topic varies from quarter to quarter.

ENGL 443 Poetry: Special Studies (5, max. 10) VLPA A poetic tradition or group of poems connected by subject matter or poetic technique. Specific topics vary, but might include poetry as a geography of mind, the development of the love lyric, the comic poem.

ENGL 444 Dramatic Literature: Special Studies (5, max. 10) VLPA Study of a particular dramatic tradition (such as expressionism or the absurd theatre) or character (the clown) or technique (play-within-a-play, the neoclassical three unities). Topics vary.

ENGL 451 American Writers: Studies in Major Authors (5, max. 15) VLPA Concentration on one writer or a special group of American writers.

ENGL 452 Topics in American Literature (5, max. 15) VLPA Exploration of a theme or special topic in American literary expression.

ENGL 453 Introduction to American Folklore (5) VLPA Study of different kinds of folklore inherited from America's past and to be found in America today.

ENGL 466 Gay and Lesbian Studies (5) I&S/ VLPA Examination of ways gays and lesbians are represented in literature, film, performance, and popular culture and how these representations are interpreted in mainstream, gay/lesbian, and academic writing.

ENGL 470 Literature, Literary Study, and Society (5) I&S/VLPA Relationship of literature to society with particular emphasis on literary education. What social values determine the educational importance of literature, what segments of society are trained to read and to write literature, and how literature is institutionalized as part of pedagogical methodology. Emphasis varies.

ENGL 471 The Composition Process (5) VLPA Consideration of psychological and formal elements basic to writing and related forms of nonverbal expression and the critical principles that apply to evaluation.

ENGL 472 Language Learning (5) VLPA Consideration of how an individual achieves psychological and esthetic grasp of reality through language; relates language development to reading skills, literary interpretation, grammar acquisition, oral fluency, discursive and imaginative writing.

ENGL 473 Current Developments in English Studies: Conference (5) VLPA .

ENGL 474 Special Topics in English for Teachers (1-10, max. 10) VLPA .

ENGL 475 Colloquium in English for Teachers (1-5, max. 10) VLPA .

ENGL 476 Puget Sound Writing Program Institute (10) VLPA Focus on the writing process and the teaching of writing, accomplished through research, writing, reflection, and demonstration of writing instruction. Affiliated with the National Writing Project.

ENGL 477 Children's Literature (5) VLPA An examination of books that form a part of the imaginative experience of children, as well as a part of a larger literary heritage, viewed in the light of their social, psychological, political, and moral implications.

ENGL 478 Language and Social Policy (5) I&S/ VLPA Examines the relationship between language policy and social organization; the impact of language policy on immigration, education, and access to resources and political institutions; language policy and revolutionary change; language rights.

ENGL 479 Language Variation and Language Policy in North America (5) I&S/VLPA Surveys basic issues of language variation: phonological, syntactic, semantic, and narrative/discourse differences among speech communities of North American English; examines how language policy can affect access to education, the labor force, and political institutions.

ENGL 481 Special Studies in Expository Writing (5) VLPA Individual projects in various types of nonfictional prose, such as biographical sketches, informational reports, literary reviews, and essays.

ENGL 483 Advanced Verse Workshop (5, max. 15) VLPA Intensive verse workshop. Emphasis on the production and discussion of student poetry. Prerequisite: ENGL 383; ENGL 384.

ENGL 484 Advanced Prose Workshop (5, max. 10) VLPA Intensive prose workshop. Emphasis on the production and discussion of student fiction and/or creative nonfiction. Prerequisite: ENGL 383; ENGL 384.

ENGL 485 Novel Writing (5, max. 15) VLPA Experience in planning, writing, and revising a work of long fiction, whether from the outset, in progress, or in already completed draft. Prerequisite: ENGL 384.

ENGL 486 Playwriting (5, max. 10) VLPA Experience in planning, writing, and revising a play, whether from the outset, in progress, or in already completed draft.

ENGL 487 Screenwriting (5) VLPA Students read screenwriting manuals and screenplays, analyze exemplary films, and write synopses, treatments, and first acts of their own screenplays.

ENGL 490 Study Abroad Program (5, max. 15) VLPA This course, for students in the Study Abroad program, relates major works of literature to the landscape and activities of their settings.

ENGL 491 Internship (1-6, max. 12) Supervised experience in local businesses and other

agencies. Open only to upper-division English majors. Credit/no credit only.

ENGL 492 Advanced Expository Writing Conference (1-5, max. 10) Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

ENGL 493 Advanced Creative Writing Conference (1-5, max. 10) Tutorial arranged by prior mutual agreement between individual student and instructor. Revision of manuscripts is emphasized, but new work may also be undertaken.

ENGL 494 Honors Seminar (5, max. 10) VLPA Survey of current issues confronting literary critics today, based on revolving themes and topics. Focuses on debates and developments affecting English language and literatures, including questions about: the relationship of culture and history; the effect of emergent technologies on literary study; the rise of interdisciplinary approaches in the humanities.

ENGL 495 Major Conference for Honors in Creative Writing (5) Special projects available to honors students in creative writing. Required of, and limited to, honors students in creative writing.

ENGL 496 Major Conference for Honors (5) Individual study (reading, papers) by arrangement with the instructor. Required of, and limited to, honors seniors in English.

ENGL 497 Honors Senior Seminar (5) VLPA Seminar study of special topics in language and literary study. Limited to honors students majoring in English.

ENGL 498 Senior Seminar (5) VLPA Seminar study of special topics in language and literary study. Limited to seniors majoring in English.

ENGL 499 Independent Study (1-5, max. 10) Individual study by arrangement with instructor.

ENGL 500 Reading Medieval Literature (5) Special problems involved in the study and interpretation of medieval texts, selected examples drawn from the beginnings of English literature to 1500.

ENGL 501 The Renaissance and Literary Tradition (5) Examination of selected texts from 1500 to 1660, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the Renaissance.

ENGL 502 English Literary Culture: 1660-1800 (5) Examination of selected texts of the Restoration and eighteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

ENGL 503 English Literary Culture: 1800-1900 (5) Examination of selected texts from the nineteenth century, concentrating on specific problems of interpretation and scholarship characteristic of the study of works written during the period.

ENGL 504 Backgrounds of Modern Literature (5) Examination of selected texts from the twentieth century, concentrating on specific problems of interpretation and scholarship

characteristic of the study of works written during the period.

ENGL 505 Theories of American Literature (5) Examination of selected texts in American Literature, concentrating on the specific problems of interpretation and scholarship characteristic of the study of works in this field.

ENGL 506 Modern and Contemporary Critical Theory (5) Engages ongoing critical conversations that inform English studies, including: language, textual production, disciplinarity, the university, capital, nation formation, postcolonialism, the environment, race, gender, class, and sexuality. The historical focus is contemporary, with attention to foundational modern theorists.

ENGL 507 History of Literary Criticism and Theory I (5, max. 15) A general introduction to the major issues in the history of criticism followed by the study of the classical theorists, including Plato, Aristotle, Longinus, and the major medieval critics. Offered: jointly with C LIT 507.

ENGL 508 History of Literary Criticism and Theory II (5, max. 15) Literary criticism and theory from the Middle Ages and the Renaissance through the eighteenth century to, but not including, Kant. Offered: jointly with C LIT 508.

ENGL 509 History of Literary Criticism and Theory III (5, max. 15) Literary criticism and theory from Kant's *Critique of Judgment* to the mid-twentieth century and the work of Northrop Frye. Offered: jointly with C LIT 509.

ENGL 510 History of Literary Criticism and Theory IV (5, max. 15) A study of the major issues in literary criticism and theory since about 1965. Offered: jointly with C LIT 510.

ENGL 512 Introductory Reading in Old English (5)

ENGL 513 Old English Language and Literature (5, max. 15)

ENGL 514 Middle English (5, max. 15)

ENGL 515 Chaucer (5, max. 15)

ENGL 516 Topics in Medieval English Literature (5, max. 15)

ENGL 517 Sixteenth-Century Literature (5, max. 15)

ENGL 518 Shakespeare (5, max. 15)

ENGL 520 Seventeenth-Century Literature (5, max. 15)

ENGL 521 Milton (5, max. 15)

ENGL 522 Topics in the English Renaissance, 1485-1660 (5, max. 15)

ENGL 524 Restoration and Eighteenth-Century Literature (5, max. 15)

ENGL 525 Topics in Restoration and Eighteenth-Century Studies (5, max. 15)

ENGL 527 Romanticism (5, max. 15)

ENGL 528 Victorian Literature (5, max. 15)

ENGL 529 Topics in Nineteenth-Century Studies (5, max. 15)

ENGL 531 Early American Literature (5, max. 15)

ENGL 532 Nineteenth-Century American Literature (5, max. 15)

ENGL 533 Modern American Literature (5, max. 15)

ENGL 535 American Culture and Criticism (5, max. 15)

ENGL 537 Topics in American Studies (5, max. 15)

ENGL 540 Modern Literature (5, max. 15)

ENGL 541 Contemporary Literature (5, max. 15)

ENGL 543 Anglo-Irish Literature (5, max. 15)

ENGL 544 World Literature in English (5, max. 15)

ENGL 546 Topics in Twentieth-Century Literature (5, max. 15)

ENGL 550 Studies in Narrative (5, max. 15)

ENGL 551 Studies in Poetry (5, max. 15)

ENGL 552 Studies in Drama (5, max. 15)

ENGL 554 Theories of Structure, Genre, Form, and Function (5, max. 15)

ENGL 555 Feminist Theories (5, max. 15)

ENGL 556 Cultural Studies (5, max. 15)

ENGL 559 Literature and Other Disciplines (5, max. 15)

ENGL 560 The Nature of Language: History and Theory (5)

ENGL 561 Stylistics (5)

ENGL 562 Discourse Analysis (5)

ENGL 563 Comparative Grammars (5)

ENGL 564 Current Rhetorical Theory (5)
Prerequisite: teaching experience.

ENGL 567 Approaches to Teaching Composition (1-5, max. 10) Readings in composition theory and discussion of practical classroom applications. Prerequisite: previous experience or concurrent assignment in teaching writing.

ENGL 569 Topics in Language and Rhetoric (5, max. 15)

ENGL 570 Practicum in Teaching English as a Second Language (3, max. 6) Discussion and practice of second-language teaching techniques. Three hours per week teaching required in addition to regular class meetings. Credit/no credit only. Prerequisite: ENGL 571 or permission of instructor.

ENGL 571 Theory and Practice on Teaching English to Speakers of Other Languages (5) Topics include second language reading, aural/oral skills, critical pedagogy, program administration, and language policy.

ENGL 572 Methods and Materials for Teaching English as a Second Language (5)
Prerequisite: LING 445 or permission of instructor.

ENGL 574 Research Methods in Second-Language Acquisition (5) Prerequisite: ENGL 572, LING 449, or permission of instructor.

ENGL 575 Pedagogy and Grammar in Teaching English as a Second Language (5) .

ENGL 576 Testing and Evaluation in English as a Second Language (5) Evaluation and testing of English language proficiency, including testing theory, types of tests, and teacher-prepared classroom tests. Prerequisite: ENGL 571 and ENGL 572 or permission of instructor.

ENGL 578 Colloquium in Teaching English to Speakers of Other Languages (5, max. 10)
Overview of major issues in second-language acquisition, teaching methodology, and classroom practice with special emphasis on links between theories of language learning and practical aspects of teaching English to speakers of other languages.

ENGL 581 The Creative Writer as Critical Reader (5) .

ENGL 586 Graduate Writing Conference (5) .

ENGL 587 Topics in the Teaching of Creative Writing (3/5) VLPA The theory and practice of teaching fiction, poetry, and creative nonfiction writing.

ENGL 590 Master of Arts Essay (5/10, max. 10) Research and writing project under the close supervision of a faculty member expert and with the consultation of a second faculty reader. The field of study is chosen by the student. Work is independent and varies. The model is an article in a scholarly journal. Prerequisite: graduate standing in English.

ENGL 591 Master of Arts for Teachers Essay (5) Research and writing project under the close supervision of a faculty member expert in the field of study chosen by the student within the MAT degree orientation toward the teaching of English, and with the consultation of a second faculty reader. The model is an article in a scholarly journal.

ENGL 592 Graduate English Studies (1-5, max. 10) .

ENGL 593 Textual Criticism (5) Introduction to paleography, codicology, analytical and descriptive bibliography; examination of the major contributions to textual theory in the nineteenth and twentieth centuries; practice in applying textual theory in editing literary works.

ENGL 595 Topics in Teaching Literature (5, max. 15) .

ENGL 597 Directed Readings (*, max. 18)
Intensive reading in literature or criticism, directed by members of doctoral supervisory committee. Credit/no credit only.

ENGL 598 Colloquium in English (1-5, max. 10) Lectures and seminars presented by visiting scholars or a range of local scholars relevant to English graduate studies.

ENGL 599 Special Studies in English (5, max. 15) .

ENGL 600 Independent Study or Research (*) .

ENGL 601 Internship (3-10, max. 10) Credit/no credit only.

ENGL 700 Master's Thesis (*) .

ENGL 800 Doctoral Dissertation (*) .

General Studies

GEN ST 101 University Learning Skills (1-3)
Introduction to university culture. Practice in skills necessary for academic success, including note-taking, test-taking, writing, active learning, and time and stress management. Academic planning. Introduction to university resources.

GEN ST 105 Introduction to Liberal Studies (1-10, max. 10) Designed to increase the academic proficiencies of new freshmen entering the University. Includes coursework in the liberal arts and sciences and related work in writing, speaking, and mathematics. Introduces students to computing and campus culture. Credit/no credit only.

GEN ST 197 Freshman Seminar (1-3, max. 3)
Small-group discussion with faculty representing a wide spectrum of academic disciplines. Topics and approaches vary. Instructor may introduce research techniques or findings, concentrate on readings in his/her area of interest, or illustrate problems and alternatives related to the study of a particular academic discipline. Credit/no credit only. Offered: AWSp.

GEN ST 199 The University Community (1-2, max. 2) Introduces students to various aspects of the University of Washington community. Includes exploration of university resources and opportunities, and academically related skill development. Credit/no credit only. Offered: A.

GEN ST 350 Independent Fieldwork (1-6, max. 18) Independent fieldwork in community agencies, apprenticeships, internships, as approved for College of Arts and Sciences credit. Faculty sponsor and internship supervisor are required. Credit/no credit only. Offered: AWSp.

GEN ST 391 Supervised Study in Selected Fields (*, max. 15) Special supervised study in a field represented in the College of Arts and Sciences. Faculty supervisor required. Credit/no credit only. Offered: AWSp.

GEN ST 470 Undergraduate Peer Instructor Practicum (1-3, max. 12) Provides instruction in group leadership and promotion of values and methods of learning within a university setting. For Peer Instructors in the FIG and TRIG programs. Credit/no credit only. Offered: AWSp.

GEN ST 480 Senior Seminar: Humanities (5)
Seminar examining the relationships and parallels in languages, literature, and culture. Each student required to complete a project or research paper on a topic appropriate to a humanities track.

GEN ST 481 Senior Seminar: Social Sciences (5) Historic and contemporary issues related to tracks considered. Each student required to complete a project or research paper on a topic appropriate to the major track.

GEN ST 493 Senior Study (5) For General Studies majors only. Faculty supervisor required. Offered: AWSp.

Geography

GEOG 100 Introduction to Geography (5) I&S
Introduction to the study of human geography and the major themes of the discipline. Topics include: human-environment interactions, migration and human mobility, patterns of health and nutrition, industrialization and urbanization, and the geography of culture and politics. Offered: AWSpS.

GEOG 102 World Regions (5) I&S Spatial study of world regions, based on historical, cultural, political, economic, and other factors. An attempt to understand the underlying forces that have led to the formation of regions and regional patterns.

GEOG 123 Introduction to Globalization (5) I&S *Sparkle* Provides an introduction to the debates over globalization. Focuses on the growth and intensification of global ties. Addresses the resulting inequalities and tensions, as well as the new opportunities for cultural and political exchange. Topics include the impacts on government, finance, labor, culture, the environment, health, and activism. Offered: jointly with SIS 123.

GEOG 195 Special Topics in Geography (1-5, max. 10) I&S .

GEOG 200 Introduction to Human Geography (5) I&S *Withers* Patterns and systems of human occupancy of the world. Emphasis on cultural processes, dynamic change, functional relations, networks, and diffusion models.

GEOG 205 Introduction to Physical Sciences and the Environment (5) NW *ZumBrunnen* Major atmospheric, hydrologic, and geomorphic processes used to interpret the character, distribution, and human significance of different natural and human-altered environments. Includes laboratory exercises for science and non-science majors, geography majors and nonmajors.

GEOG 207 Economic Geography (5) I&S *Beyers, Harrington* The changing locations and spatial patterns of economic activity, including: production in agriculture, manufacturing, and services; spatial economic principles of trade, transportation, communications, and corporate organization; regional economic development, and the diffusion of technological innovation. Offered: AWS.

GEOG 208 Geography of the World Economy: Regional Fortunes and the Rise of Global Markets (5) I&S Examines the relationship between the globalization of economic activity and regional development. Topics include international trade, colonialism, industrial capitalism, advanced capitalism, and the globalization of labor markets.

GEOG 227 Geographic Perspectives on Minorities in the United States (5) I&S .

GEOG 230 Urbanization and Development: Geographies of Global Inequality (5) I&S *Lawson* Examines global to local interactions of economic, political, and social forces shaping urbanization and development processes across the globe. Provides an introduction to critical development studies, focusing on Latin America, Africa, and Asia. Also examines debates over the causes and geographic patterns of social inequality worldwide.

GEOG 236 Geography of Greater China (5) I&S *Chan* Studies the geography of development processes, patterns, and problems in "Greater China": mainland China, Taiwan, and Hong Kong. Covers physical geography, history, and economic and political systems, with major focus on geographical issues in China's development: agriculture, population, industry and trade, and relations with Hong Kong and Taiwan. Offered: jointly with SISEA 236.

GEOG 245 Geographic perspectives on U.S. Population Diversity (5) I&S *Withers* Introduction to population geography. Offers a practical understanding of population processes (fertility, mortality, and migration); knowledge of geographic variation in population structures and characteristics; knowledge of data sources for demographic research; experience using formal demographic methods for geographic research; and an appreciation for the demographic underpinnings of contemporary social issues. Offered: W.

GEOG 258 Maps and GIS (5) I&S Explores how people represent the world with maps and geographic information systems (GIS). Trains students in map use for basic navigation, urban management, and environmental analysis. Considers role of spatial databases in commerce, decision-making, and analysis. Helps map readers better determine quality, usefulness, and representation of information. Offered: W.

GEOG 270 Geographies and International Development and Environmental Change (5) I&S Considers the meaning of development and how debates over international development link to environmental concerns. Examines how the globalization of agricultural production and debates over genetically modified food alter ideas about development, nature, and the environment. Addresses fair trade policies and practices and the obligations of multinational corporations. Offered: A.

GEOG 271 Geography of Food and Eating (5) I&S *Jarosz* Examines food production, distribution, and consumption issues across geographic scales. Focus ranges from the microcosm of the individual body to food and eating at the national and global scales. Explores the political, social, cultural, and economic dimensions of food and eating in particular spaces, places, environments, contexts, and regions. Offered: Sp.

GEOG 276 Introduction to Political Geography (5) I&S *Brown* Examines both the geography of politics and the politics of geography at a variety of spatial scales and in different global locations. Typical topics include: geographies of the state and state power; geopolitics and globalization; national and local politics, and other politics of culture, health, nature, and the body. Offered: Sp.

GEOG 277 Geography of Cities (5) I&S *England, Withers* Study of (1) systems of cities—their location, distribution, functions, and competition; and (2) their internal structure—the location of activities within urban areas. Particular emphasis on current urban problems—sprawl, housing, segregation, economic growth, and metropolitan transportation.

GEOG 280 Introduction to the Geography of Health and Health Care (5) I&S *Mayer* Concepts of health from a geographical viewpoint, including human-environment relations, development, geographical patterns of

disease, and health systems in developed and developing countries. Offered: Sp.

GEOG 295 Special Topics in Geography (1-5, max. 10) I&S **GEOG 300 Concepts of Regions (5) I&S** Historical development and application of the concept of region. Examines systematically how varied societies constitute parts of a total world order.

GEOG 301 Cultural Geography (5) I&S Analysis of the role of culture in the formation of landscape patterns; components of culture that contribute not only to a "sense of place," but also to the mosaic of settlement patterns and occupancy that can be traced to culture.

GEOG 302 The Pacific Northwest (3) I&S *Beyers* Settlement pattern in the Pacific Northwest, emphasizing economic and historical factors, including the location of resource-oriented industries, policies regarding the use of public lands, and bases of the development of major urban areas in the region. Offered: W.

GEOG 304 Western Europe (5) I&S Physical and socioeconomic characteristics of western Europe. Contemporary political and economic integration trends in their regional context.

GEOG 308 Canada: A Geographic Interpretation (5) I&S *Sparke* Examines the overlapping economic, cultural, and political geographies shaping life in contemporary Canada. Topics include: free trade, constitutional crisis, feminism in Canada, aboriginal politics, and border region phenomena. Attention paid to how specific geographic interpretations of Canada by Canadians actually play a part in national life. Offered: jointly with SISCA 308; Sp.

GEOG 310 Immigrant America: Trends and Policies from a Geographic Perspective (5) I&S *Ellis* Examines U.S. immigration trends and policies from a geographic perspective. Topics include where immigrants come from, where they settle in the United States, immigrant employment enclaves, the effects of U.S. immigration policy on immigrant settlement and employment patterns, illegal immigration, citizenship, and barriers to immigrant success in the United States.

GEOG 313 East Asia (5) I&S *Chan* Introduction to the contemporary geography of East Asia, including China, Hong Kong, Taiwan, Japan, and Korea. Topics include: physical geography, historical settings, general development patterns, agriculture, population, industry, and trade. Focuses on major geographic issues in development. Case studies from different countries used to illustrate various themes.

GEOG 315 Explanation and Understanding in Geography (5) I&S *Brown* Covers the beginning steps in the research process. Introduces the discipline of geography, the department, and current faculty through the research aims of explanation and understanding that frame social scientific inquiry. Students develop basic library and writing skills as preparation for future research methods classes and independent research.

GEOG 316 Urban Economics (5) I&S Application of economic analysis to urban trends, problems, and prescriptions, such as changing urban form and function, urban public finance, housing and renewal, poverty and race, transportation, and environmental problems.

Prerequisite: ECON 200. Offered: jointly with ECON 316.

GEOG 326 Quantitative Methods in Geography (5) I&S *Chan* Introduction to quantitative methods in geography, with a primary focus on statistical techniques. Examines the basic concepts, reasoning, and procedures geographers use in developing, analyzing, applying, and presenting quantitative methods. Topics include: generating and describing data; elementary probability, hypothesis testing, comparative tests; finding relationships; and using and misusing statistics. Offered: A.

GEOG 330 Latin America: Landscapes of Change (5) I&S *Lawson* Examines operation of economic, social, and political processes across countries of Latin America—on international, national, and local scales—to understand common issues facing the region and different impacts in particular countries. Topics include internationalization of Latin American economies; agrarian and urban change; popular movements. Offered: W.

GEOG 333 Russia's Changing Landscape (5) I&S *ZumBrunnen* The Russian landscape as it has been affected by Soviet planning, migration and settlement, urbanization, industrialization, the results of collectivization in agriculture, and the growth of a transport network.

GEOG 335 Geography of the Developing World (5) I&S Characteristics and causes, external and internal, of Third World development and obstacles to that development. Special attention to demographic and agricultural patterns, resource development, industrialization and urbanization, drawing on specific case studies from Asia, Africa, and Latin America. Recommended: GEOG 100 or GEOG 230. Offered: jointly with SIS 335.

GEOG 336 Development and Challenge in China (5) I&S *Chan* Examines the geography of China's development since 1949. Introduces China's physical geography, history, and economic and political system. Emphasizes China's uneven development in agriculture, population, industry, and trade. Also examines problems China faces in meeting its internal food demand, as well as the external processes of globalization. Offered: W.

GEOG 342 Geography of Inequality (5) I&S *England* Geographies of social, political, and economic inequality. Focus is usually on North American cities. Examines the theoretical underpinning of inequality. Explores topics such as the spatial distribution of wealth and poverty, the geographies of exclusion, and discrimination in paid employment and housing.

GEOG 343 Comparative Geographies of Youth (5) I&S *Jeffrey* Examines how three key global processes - rising levels of formal education, changing health regimes, and environmental transformation - are shaping youth in the US and South Asia. Examines ways young people rework broader structures, paying particular attention to their economic livelihoods, cultural practices, and political engagements. Offered: jointly with SISSA 343; A.

GEOG 344 Migration in the Global Economy (5) I&S *Mitchell* Analyzes the relationship between human mobility in the late 20th century and changes in the global economy. Allows the students to gain familiarity with scholarly research on international migration from a

diversity of approaches and methods. Offered: jointly with SIS 344; W.

GEOG 349 Geography of International Trade (5) I&S Harrington Introduces the theories and practice of international trade and foreign direct investment. Topics include: trade theory and policy; economic integration; currency markets and foreign exchange; trade operations and logistics; the international regulatory environment; and marketing, location and entry, and finance, accounting, and taxation. Offered: W.

GEOG 350 Local Economies and Market Areas (5) I&S Intermediate economic geography. Methods and concepts for analysis of economic and business patterns, processes, and problems at regional and local levels. Tools for collecting, organizing, and analyzing data for investigating local economic issues. Recommended: GEOG 207. Offered: Sp.

GEOG 360 Principles of Cartography (5) I&S, QSR Nyerges Origins, development, and methods of cartography. Principles of data representation and map design for thematic and topographic mapping. Introduction to the use of computers as geographic information systems (GIS). Offered: ASp.

GEOG 366 Introduction to Regional Economic Development (3/5) I&S Harrington The process of regional economic development. Theories and conceptualizations of economic growth and structural change, technological change and industrial development, spatial variation in economic activities and government policies. Recommended: GEOG 207; ECON 201.

GEOG 367 Economic Uses of Geographic Information (5) I&S Harrington Uses of area data and the geographic information systems (GISs) that handle them in routing, marketing, service-area assessment, and site location. Considers key economic-geography concepts, marketing approaches, questions of data availability and suitability, and GIS. Prerequisite: GEOG 360.

GEOG 370 Problems in Resource Management (5) I&S ZumBrunnen Principles and practices of effective conservation and utilization of natural resources. Role of technology in resource use. Physical, political, and economic aspects of resource management for food, population, land, water, air, energy, and timber resources. Recommended: GEOG 100. Offered: Sp.

GEOG 371 World Hunger and Resource Development (5) I&S Jarosz Addresses issues of hunger and poverty in their relationship to resource development at the local, national, and global levels. Examines various approaches to the problem of world hunger rooted in critical development studies. Recommended: GEOG 230, GEOG 330, or GEOG 335.

GEOG 372 Asian Sustainable Development (5) I&S Examines the contemporary relationship between environmental protection and development paths in Asia. Inquires into the forces driving both environmental change and societal responses (state and local regulations, social movements, etc.) to that change, at many geographical scales. Asian concepts of nature-society relations also explored. Offered: jointly with SISA 372; W.

GEOG 375 Geopolitics (5) I&S Sparke An introduction to both political geography and

geopolitics, addressing the fundamental links between power and space. Topics covered include: theories of power, space, and modernity; the formation of modern states; international geopolitics in the aftermath of the Cold War; the post-colonial nation-state; and the geopolitics of resistance. Offered: jointly with SIS 375.

GEOG 377 Urban Political Geography (5) I&S Morrill Examines how the spatial structure of cities and towns affects and is affected by political processes. Considers both traditional and newer forms of politics, as global and local issues. Special attention paid to where politics take place within local contexts across state, civil society, home, and the body. Offered: Sp.

GEOG 378 Policing the City (5) I&S Herbert Investigates how and why formal and informal order is established in urban areas, how this order produces advantages and disadvantages, and possibilities of alternative visions of order. Topics include formal means of control (zoning, laws, policing, building codes) and informal means of control (gossip, ostracism, peer pressure, local politics). Offered: jointly with LSJ 378; A.

GEOG 380 Geographical Patterns of Health and Disease (4) I&S Mayer Geography of infectious and chronic diseases at local, national, and international scales; environmental, cultural, and social explanations of those variations; comparative aspects of health systems. Offered: W.

GEOG 395 Special Topics in Geography (1-5, max. 10) I&S .

GEOG 397 Tutorial for Majors (1) Overview of the discipline of geography including faculty research interests, teaching philosophies, and course offerings as well as essential study and research skills and career developments strategies. Students meet concurrently with faculty adviser to identify academic interests and devise plan of studies. Credit/no credit only. Offered: ASp.

GEOG 401 Culture, Capital, and the City (5) I&S Examines current themes in social theory as they apply to the urban landscape. Includes the interconnections of cultural and economic processes and the spatial patterning of race, class, and gender in the modern urban context. Offered: A.

GEOG 425 Qualitative Methodology in Geography (5) I&S Jarosz Historical and philosophical overview of qualitative methodology in design of geography research strategies. Techniques of interviewing, participant observation, and archival research. Forms of analyses such as textual interpretation, discourse analysis and computer-aided analyses of interview transcriptions and ethnography. Questions of ethics, field notes and write-up. Offered: W.

GEOG 426 Quantitative Methods in Geography (5) I&S, QSR Withers Quantitative methods for empirical research in geography. Emphasis on statistical analysis; use of geographic data bases like the United States Census; understanding special issues and problems associated with geographically ordered data; verbal and graphic presentation in a computer environment. Recommended: GEOG 326. Offered: Sp.

GEOG 430 Contemporary Development Issues in Latin America (5) I&S Lawson

Contemporary development issues in Latin America, seen from a spatial perspective. Concept of development; competing theories as related to various Latin American states. Economic structural transformation, migration, urbanization, regional inequality, and related policies. Offered: A.

GEOG 431 Geography and Gender (5) I&S Jarosz Examines theories and case studies across international, national, and regional scales in order to illustrate the impacts of social and economic processes upon the construction of gender in particular places. Offered: Sp.

GEOG 432 Population and Urbanization Problems of Russia and the Newly Independent States (5) I&S ZumBrunnen Historical background and evolution of Soviet/Russian population and urbanization processes and problems. Distinguishing demographic characteristics and recent trends in the growth and migration of rural and urban populations. Analysis of problems associated with ethnicity and nationality, regional-temporal labor demand and supply issues, and spatial-temporal well-being. Offered: odd years; Sp.

GEOG 433 Resource Use and Management in Russia and the Newly Independent States (5) I&S ZumBrunnen Geographic and historical background of the natural resource base of Russia and the Newly Independent States. Geographic and historical perspectives on Soviet natural resource use and management in theory and practice. Implications of the breakup of the USSR for natural resource use and management. Offered: odd years; W.

GEOG 435 Industrialization and Urbanization in China (5) I&S Chan Examines the impacts of industrialization strategies adopted by the Peoples Republic of China on urbanization and rural-urban relations. Topics include: economic development strategies, industrial geography, rural industrialization, urban development patterns, migration, and urbanization policies. Recommended: GEOG 336. Offered: Sp.

GEOG 436 Social and Political Geographies of South Asia (5) I&S Jeffrey Introduces the social and political geographies of South Asia through reference to agrarian change in India. Outlines key concepts related to the reproduction of inequality in the region, particularly theories of caste, class, gender, and religious communalism, and examines the mechanisms through which these inequalities are reproduced in South Asia. Offered: jointly with SISSA 436, Sp.

GEOG 438 Cities of East Asia: Geography and Development (5) I&S Chan Examines urban development in East Asia from a geographic and comparative perspective focusing on issues in development, and the interaction of geography, history, politics, and economics. Major topics include economic development and urbanization; regions and urban systems; migration; urban social and spatial structures; globalization and governance. Offered: Sp.

GEOG 439 Gender, Race, and the Geography of Employment (5) I&S Ellis Focuses on the geography of employment for men and women of different racial and ethnic backgrounds in American cities. Presents evidence on labor market inequality for different groups and explanations of these differences. Emphasizes the importance of a spatial perspective in understanding employment outcomes for women and minorities.

GEOG 440 Regional Analysis (5) I&S *Beyers* Regional industrial structures and economic change. Application of shift-share, cohort, multiplier, input/output, and programming models to the analysis and projection of regional population and employment patterns, regional growth differentials, and regional impact analysis. Recommended: GEOG 207. Offered: Sp.

GEOG 443 Location and Movement Models (5) I&S *Morrill* Application of models of optimum location and allocation; assignment, transportation, and spatial equilibrium; spatial interaction; geographic simulation; and spatial diffusion.

GEOG 445 Geography of Housing (5) I&S *Withers* Focuses on the geography of housing, especially in the United States. Topics include: the American dream of home ownership; housing affordability and differential access to home ownership; homelessness; the history of public housing; housing demography; residential mobility and neighborhood change, and discrimination in the housing market. Offered: Sp.

GEOG 447 The Geography of Air Transportation (5) I&S Geographic analysis of world air routes, passenger and cargo flows, and airport activities; consideration of physical, economic, political, and institutional determinants of routes and flows.

GEOG 448 Geography of Transportation (5) I&S *Chang* Circulation geography, principles of spatial interaction emphasizing commodity flow, the nature and distribution of rail and water transport, the role of transport in area development.

GEOG 449 Geography of Ocean Transportation (5) I&S Geographic analysis of ocean trade routes, cargo and passenger flows, and port activities. Evaluation of the role of the transportation carrier in international trade.

GEOG 451 Cultural Geography of Latin America (5) I&S Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with SISLA 451.

GEOG 458 Map Sources and Errors (5) I&S Analysis and appraisal of source materials for maps, production constraints of mapping agencies, coverage and quality. Focus on errors inherent in maps and geographic information; metadata resources; judgment of fitness for specific applications. Prerequisite: 2.0 in GEOG 360. Offered: odd years; W.

GEOG 460 Geographic Information Systems Analysis (5) I&S Methods of Analysis provided by geographic information systems (GIS). Operations on map information including map overlay, aggregation/disaggregation, and other spatial and attribute procedures. Exposure to raster and vector software. Review of capabilities of current available GIS software. Prerequisite: 2.0 in GEOG 360. Offered: A.

GEOG 461 Urban Geographic Information Systems (5) I&S *Nyerges* Use of geographic information systems to investigate urban/regional issues; focus on transportation, land-use and environmental issues; all urban change problems considered. GIS data processing strategies. Problem definition for GIS processing. Data

collection, geocoding issues. Data structuring strategies. Prerequisite: 2.0 in GEOG 360; recommended: GEOG 277. Offered: W.

GEOG 463 Geographic Information Systems Workshop (5) I&S *Nyerges* Practical experience applying geographic information system (GIS) tools to analyze spatial data. Workshop format requires student-motivated projects; diverse backgrounds encouraged. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: Sp.

GEOG 465 Analytical Cartography (5) I&S Algorithms and data structures for selected topics in computer-assisted cartography. Emphasis on point, line, area, and surface data representation, map design, generalization, and data transformations. Prerequisite: either 2.0 in GEOG 460 or 2.0 in GEOG 461. Offered: odd years; W.

GEOG 466 Regional Economic Development (5) I&S *Harrington* Provides a theoretical overview of sub-national, regional economic growth and structural change, including the roles of interregional interaction and international trade, technological change, social, and legal institutions. Emphasizes inter-regional disparities in the context of relatively wealthy countries. Explores the constraints and effectiveness of government (and other organizations') policy. Offered: W.

GEOG 471 Methods of Resource Analysis (5) I&S *ZumBrunnen* Economic and noneconomic criteria for resource analysis. Theory and methods of linear models of natural resource analysis. Includes materials-balance modeling, residuals management, constrained system optimization approaches to water quality analysis, land-use patterns and interregional energy use, and multiple objective planning techniques applied to natural resource problems. Recommended: GEOG 370.

GEOG 472 Ecoscapes: Nature, Culture, and Place (5) I&S Relationship between nature, culture, and place as the heart of geographic inquiry. Examines how perceptions of nature are influenced by changing political-economic, cultural, and scientific practices. Uses cultural studies of ecological science as a primary method of analysis. Offered: Sp.

GEOG 474 Geography and the Law (5) I&S *Herbert* Examines the relationship between geography, law, and socio-legal analysis; reviews significant instances where law and geography intersect, such as the regulation of public space, the regulation of borders and mobility, and disputes over property and land use. Offered: jointly with LSJ 474.

GEOG 476 Women and the City (5) I&S *England* Explores the reciprocal relations between gender relations, the layout of cities, and the activities of urban residents. Topics include: feminist theory and geography (women, gender, and the organization of space); women and urban poverty, housing and homelessness; gender roles and labor patterns; geographies of childcare; and women and urban politics. Offered: jointly with WOMEN 476.

GEOG 477 Advanced Urban Geography (5) I&S *Brown* Geographic patterns and social processes within metropolitan areas. Canvases current research topics, methods, and theoretical debates in urban geography. Issues covered range across urban economic, political, and

cultural geography. Recommended: GEOG 277. Offered: Sp.

GEOG 478 Intraurban Spatial Patterns (5) I&S *Mitchell* Geographic patterns and processes within metropolitan areas. Economic land-use patterns (commercial and industrial location), social land-use patterns (segregation, housing, and neighborhood change), urban political geography, analysis of urban infrastructure, and assessment of contemporary and future trends in urban development. Recommended: GEOG 277. Offered: Sp.

GEOG 479 Race, Ethnicity, and the American City (5) I&S *Ellis* Explores America's cities as sites where ethnic and racial interaction have generated specific patterns of opportunity and disadvantage in housing and labor markets; how ethnic identities and racial formations are changed by living and working in cities, and questions of assimilation, multiculturalism, and America's ethno-racial future.

GEOG 480 Environmental Geography, Climate, and Health (5) I&S *Mayer* Demonstrates and investigates how human-environment relations are expressed in the context of health and disease. Local and global examples emphasize the ways medical geography is situated at the intersection of the social, physical, and biological sciences. Examines interactions between individual health, public health, and social, biological, and physical phenomena. Offered: W.

GEOG 486 Problem Analysis in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local and regional issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with ENVIR 474/ESRM 486/URBDP 443; A.

GEOG 487 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: either GEOG 486, CFR 474, or ENVIR 486. Offered: jointly with CFR 475/ENVIR 487; W.

GEOG 488 Research in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised objectives and methods sections of interdisciplinary project and present results section. Prerequisite: either GEOG 487, CFR 475, or ENVIR 487. Offered jointly with CFR 476/ENVIR 488; Sp.

GEOG 490 Field Research: The Seattle Region (6) I&S *Morrill* Field methods for contemporary urban research. Survey designs used in the analysis of transportation, land use, location of employment, shopping and housing, political fragmentation, and environmental degradation. Field report required, based on field work in the Seattle region.

GEOG 492 Library Research in Geography (3) I&S Introduction to library research methods in geography. Review and assessment of geographical bibliographies and abstract services for monographs, periodicals, gazetteers, dictionaries, encyclopedias, government publications, and statistical sources. Credit/no credit only.

GEOG 493 Assessing Geographic Learning (2) Harrington Enables graduating geography majors to articulate and assess their academic development and professional readiness by examining ways of representing geographic skills and capabilities. Offered: Sp.

GEOG 494 Senior Essay (3) I&S Supervised individual research and writing of major paper during senior year. Offered: AWSp.

GEOG 495 Special Topics (*, max. 15) I&S Topics vary and are announced in the preceding quarter. Offered: AWSpS.

GEOG 496 Internship in Geography (3/5, max. 12) Internship in the public or private sector, supervised by a faculty member. Credit/no credit only. Offered: AWSpS.

GEOG 497 Tutorial in Geography (1-5, max. 15) I&S *ZumBrunnen* Intensive directed study and tutoring. Literature reviews, formulations of project outlines and research designs, orientation in contemporary geographic thought and trends. Directed writing. Required for honors students. Offered: AWSp.

GEOG 498 Undergraduate Seminar in Economic Geography and Regional Science (3) I&S Selected advanced topics and current problems in economic geography. Emphasis on formulating research questions, developing an appropriate research process, selecting methods, searching for resources, writing up and documenting research results, and using the Internet for research purposes. Offered: Sp.

GEOG 499 Special Studies (*, max. 15) Supervised reading programs, undergraduate and graduate library and field research; special projects for undergraduate honors students. Offered: AWSpS.

GEOG 500 Contemporary Geographic Thought (4, max. 8) .

GEOG 502 Professional Writing in Geography (*, max. 6) .

GEOG 505 Research Seminar: China (5, max. 10) *Chan* Offered: A.

GEOG 506 Research Seminar: Southeast Asia (3, max. 6) .

GEOG 507 Research Seminar: Canadian Problems (5, max. 10) Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with SCSA 507.

GEOG 512 History of Geographic Thought (5) Historical development of modern geography. Emphasis on various philosophical and methodological debates in geography and the contexts from which they emerged. Investigates geography's foundational concepts and

institutions; how they have responded to — and influenced — the world around them. Offered: A.

GEOG 513 Research Grant Workshop (5, max. 10) Writing research proposals. Participants learn to identify and approach sponsors; practice the peer-review process; develop a competitive research proposal. Prerequisite: GEOG 512 or GEOG 515 or equivalent; training and experience with quantitative, qualitative, or cartographic analysis; an already-formulated research project.

GEOG 515 Evidence and Explanation in Geography (5) Sparke Introduces the main strands of philosophical debate shaping the discipline of human geography, including description, prediction, explanation, abstraction, structuration, representation, and institutionalization. Focuses on ways “theories” from outside the discipline have shaped the questions and concerns of geographers, and the ways geography reworks such theories. Offered: Sp.

GEOG 520 Research Seminar: Geographic Information Representation (5) Nyerges Current issues in geographic information representation for geographic information systems (GIS). Includes representation for visualization, databases, and analyses. Prerequisite: one course in GIS.

GEOG 526 Advanced Quantitative Methods in Geography (4) Morrill, Withers .

GEOG 531 Latin American Development Seminar (5, max. 10) Lawson Evolution of development theory in Latin America from a spatial perspective. Theories and development issues, using case studies from Latin America. How geographers have conceptualized development problems and solutions. Prerequisite: GEOG 430.

GEOG 532 Rural Development Seminar (5, max. 10) Jarosz Contemporary issues in international development theory related to regional and agrarian change, with emphasis on Africa.

GEOG 533 Research Seminar: Russia and the Newly Independent States (5, max. 10) *ZumBrunnen .*

GEOG 536 Advanced Research Seminar on South Asian Geographies (5) Jeffrey Examines geographies of social inequality in South Asia through reference to how space, place, and the environment are shaping practices of political struggle in the region. Considers how liberalization, democratization and religious communalization are changing the political geography of South Asia. Offered jointly with SSSA 536, Sp.

GEOG 538 Research Seminar: Geography of Transportation (3, max. 6) Mayer .

GEOG 540 Research Seminar: Industrial Geography (5, max. 10) Beyers Offered: W.

GEOG 541 Research Seminar: Feminist Geographies (5) England Explores major research themes in feminist geographies. Particular attention to the concept that gendered identities and spaces are discursively (re)produced. Emphasizes recent feminist scholarship that emphasizes difference, as well as the intersections between gender, “race,” ethnicity, sexuality, age, nationality, class, and other social identities and divisions. Offered: jointly with WOMEN 541; W.

GEOG 542 Research Seminar: Social and Population Geography (5, max. 10) Morrill .

GEOG 543 Research Seminar: Immigration, Ethnicity, and Employment (5) Ellis Employment patterns and outcomes for immigrants and ethnic minorities. Emphasis is on the U.S. experience and topics covered include labor market segmentation, theories of discrimination, job/labor queues, networks, ethnic niches and enclaves, skills and spatial mismatches. Specific focus changes annually.

GEOG 550 Research Seminar in Location Theory (3) Current research topics in economic and business geography. Focus shifts from year to year. Examples include spatial structures and economic development, economic geography of information, transaction cost perspectives of the location problem, and relationships between organization theory and theories of spatial organization.

GEOG 553 Advanced Topics in Cultural Geography (5, max. 10) Mitchell Focuses on important contemporary topics in cultural geography. Examines current theoretical debates in anthropology, sociology, geography, feminist criticism, and cultural studies as they relate to the landscape. Include critical questions surrounding issues of representation and ethnography. Designed to help student prepare for advanced fieldwork. Offered: Sp.

GEOG 560 Research Seminar: GIS Analysis (5, max. 10) Current research topics in geographic information systems. Particular emphasis on analytical methods, and their use in practical circumstances. Prerequisite: graduate status in GIS or related field. Offered: Sp.

GEOG 563 Algorithms and Data Structures for Geographic Information Systems (5) Anatomy of a software package for geographic information processing. Emphasis on analysis of algorithmic complexity and software design techniques. Presents dynamic data structures, persistence of temporal data, and data flow algorithms. Prerequisite: GEOG 460, GEOG 465, and CSE 326 or CSE 373.

GEOG 567 Research Seminar: Geography and Economic Development (5, max. 10) *Harrington* Explores ways in which economic and social changes affect the well-being and development of subnational, regional economies. Explanatory roles of such factors as labor and labor institutions, governments, technical change, corporations, capital markets, information costs, and international trade in the process of global restructuring. Specific focus changes annually.

GEOG 570 Research Seminar: Natural Resources Analysis (3, max. 6) ZumBrunnen .

GEOG 571 Research Seminar: Critical and Normative Ecologies (5) Engages in an ecocritique of mainstream managerial environmentalisms by unearthing their ideological bases, and delves into the ethical underpinnings of ecological resistance struggles or green utopias such as ecofeminist, deep and social ecology, and environmental justice movements. Offered: A.

GEOG 573 Urban Political Geography: Research Seminar (5) Brown Covers both classic and contemporary theoretical debates and research on the relation between power, place, and the local scale. Considers both

conventional sites (e.g., the local state) as well as new forms and locations of city politics (e.g., sexuality and the body).

GEOG 574 Research Seminar: Geography, Law, and Social Control (5) *Herbert* Explores relationship between the construction and enforcement of law and the landscape of lived experience; reviews major approaches in socio-legal analysis and seeks to augment these with insights from contemporary human geography research; explores various ways in which geographical variance shapes legal behavior. .

GEOG 575 Advanced Political Geography (5) *Sparks* Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with SIS 575.

GEOG 577 Research Seminar: Internal Spatial Structure of Cities (4, max. 8) *Hodge* Offered: A.

GEOG 578 Research Seminar: Theorizing the City (5) *Ellis* Considers classic and contemporary writings in urban theory in the twentieth century, including social ecology (Chicago School), political economy, and contemporary theoretical debates in poststructuralism, deconstructionism, and culture as they relate to cities and space. Offered: W.

GEOG 580 Medical Geography (3) *Mayer* Geography of disease, consideration in health systems planning. Analysis of distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services; distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research; health-related issues. Offered: jointly with HSERV 586; W.

GEOG 581 Seminar in Medical Geography (5, max. 10) *Mayer* Intensive research seminar dealing with new and promising research themes in medical geography and public health. Offered: jointly with HSERV 585; A.

GEOG 588 Advanced Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discussion of current and important theoretical and empirical papers in urban ecology. Students continue to research interdisciplinary urban ecology projects while developing publishable manuscripts and oral presentations. Offered: jointly with CFR 588; AWSp.

GEOG 597 Tutorial for Graduate Students (2) Introduces beginning geography students to the main research agendas of the faculty; identifies the range of current discourse communities formed by current faculty and graduate students; establishes a process of mentoring and long-term planning for each new graduate student. Credit/no credit only. Offered: A.

GEOG 598 Geography Colloquium (1, max. 3) Participation in, and critique of, student thesis and dissertation research, faculty research, and visitor contributions. Offered: AWSp.

GEOG 599 Effective Teaching of Geography (1) Designed for the ongoing development of

effective teaching and professional skills. Topics/activities include micro-teaching, communications and presentation skills; course organization, time management, personal and small group dynamics; design of geography curricula using simulations and computer-assisted instruction in the classroom, and fostering of creative thinking. Credit/no credit only. Offered: A.

GEOG 600 Independent Study or Research (*) Offered: AWSpS.

GEOG 700 Master's Thesis (*) Offered: AWSpS.

GEOG 800 Doctoral Dissertation (*) Offered: AWSpS.

Germanics

Credit Restrictions: Students may receive credit for only one course in each of the following: 101, 111, and the first 5 credits of 104; 102, 111, and the second 5 credits of 104; 103 and the last 5 credits of 104. They may, however, receive credit for courses in different first-year sequences if the courses are taken in progressively more advanced order (e.g., the first 5 credits of 104 followed by 102 and 103). 100 is the equivalent of 101, 102, 103, or 15 credits of 104.

GERMAN 100 Intensive First-Year German (15) Accelerated first-year German. Speaking and listening. Secondary objectives are reading and writing. Offered: S.

GERMAN 101 First-Year German (5) The methods and objectives are primarily communicative, with emphasis on speaking and listening. Secondary objectives are reading and writing. (See credit note following 104.) Prerequisite: score of 0-11 on GER TL placement test if German is language of admission. Offered: AWS.

GERMAN 102 First-Year German (5) The methods and objectives are primarily communicative, with emphasis on speaking and listening. Secondary objectives are reading and writing. (See credit note following 104.) Prerequisite: either GERMAN 101 or score of 12-35 on German placement test. Offered: AWSp.

GERMAN 103 First-Year German (5) The methods and objectives are primarily communicative, with emphasis on speaking and listening. Secondary objectives are reading and writing. (See credit note following 104.) Prerequisite: either GERMAN 102, GERMAN 111, or score of 36-56 on German placement test. Offered: AWSpS.

GERMAN 104 Individualized First-Year German (1-15, max. 15) Individualized approach to elementary German instruction. Students progress at their own pace. Credits vary. Depending upon amount of material mastered, any number of credits up to 15 may be earned per quarter. Credit/no credit only.

GERMAN 111 Basic German Review (5) Combines in one quarter the contents of 101 and 102. Designed for students with background in German who however feel unprepared to take 102. Highly motivated beginners are also encouraged to take the course. Offered: A.

GERMAN 121 First-Year Reading German (5) Special beginning course devoted exclusively to the reading objective. Offered: AS.

GERMAN 122 First-Year Reading German (5) Special beginning course devoted exclusively to the reading objective; 122 continuation of 121. Offered: WS.

GERMAN 150 Conversational German Through Films (2, max. 6) Conversational practice in small groups based on films. Because series progresses through the year, beginners may enroll only Autumn Quarter. May be taken concurrently with other Germanics courses. Cannot be taken for credit if 250 previously taken. Offered: AWSp.

GERMAN 190 Crime Scenes: Investigating the Cinema and Its Cultures (5) *VLPA Ames, Nestingen* Teaches how to analyze film by closely studying crime scenes from historical and contemporary German and Scandinavian cinema. Directors studied include Fritz Lang, Carl Th. Dreyer, Billy Wilder, and Lars von Trier. Offered jointly with SCAND 190.

GERMAN 199 Supervised Study (1-10, max. 10) Study in German language and culture.

GERMAN 200 Intensive Second-Year German (15) *VLPA* Accelerated second-year German. Systematic review of German grammar. Intensive practice in conversation, reading and writing. Recommended: GERMAN 103. Offered: S.

GERMAN 201 Second-Year German (5) *VLPA* Systematic review of German grammar. Intensive practice in conversation, reading, and writing. Recommended: GERMAN 103. Offered: AWSp.

GERMAN 202 Second-Year German (5) *VLPA* Systematic review of German grammar. Intensive practice in conversation, reading, and writing. Recommended: GERMAN 201. Offered: AWSp.

GERMAN 203 Second-Year German (5) *VLPA* Systematic review of German grammar. Intensive practice in conversation, reading, and writing. Recommended: GERMAN 202. Offered: AWSp.

GERMAN 210 Classics of German Literature and Thought (5) *VLPA* Introduction to major figures of German culture from the Reformation to the present, their contribution to the intellectual life of the Western world. Luther, Kant, Goethe, Schopenhauer, Marx, Freud, Nietzsche, Kafka, Brecht, and Mann. In English.

GERMAN 220 Origins of the Germanic Languages (5) *VLPA Barrack, Voyles* Introduction to basic grammatical concepts, terminology, and linguistics with emphasis on German-English relationship. Overview of phonology, morphology, syntax, and history of Germanic languages and people, both ancient and modern. Languages covered include Old, Middle, and New High German; English, Frisian, Dutch, Old Saxon, and Gothic. Taught in English. Offered: jointly with LING 220; AWSpS.

GERMAN 221 The German Express: Second Year (10) *VLPA* Intensive version of 201 and 202. Stresses development of reading and speaking skills. Limited to students who have demonstrated exceptional skills in first-year German. Recommended: GERMAN 103. Offered: A.

GERMAN 230 Conversational German (5) *VLPA* Intensive conversational German. Recommended: GERMAN 103. Offered: S.

GERMAN 243 Fairy Tale and Fantasy (5) *VLPA* Studies of the Grimm brothers' fairy tales, their

reception in different cultural frameworks, and their influence on fantasy literature from the nineteenth century to the twentieth century, including discussions of their sociological, psychological, and psychoanalytical implications and gender issues. In English.

GERMAN 250 Advanced Conversational German Through Films (2, max. 6) VLPA Conversational practice in small groups based on films. May be taken concurrently with other Germanics courses. Recommended: GERMAN 103 and GERMAN 150. Offered: WSp.

GERMAN 293 Introduction to Contemporary German Culture (5) I&S/VLPA Introduction to culture of today's German-speaking world through readings from various media and discussion of diverse manifestations of both high and popular culture, its underlying beliefs and values, and its institutions and historical background. Readings and discussions in English.

GERMAN 295 The Contributions of German Jews to German Culture (5) I&S/VLPA Contribution, assimilation and alienation of German-speaking Jews — such as Karl Marx, Sigmund Freud and Franz Kafka — emphasizing the multi-cultural nature of that which is understood as "German culture."

GERMAN 299 Supervised Study (1-5, max. 10)

GERMAN 300 Studies in Germanics (5, max. 15) VLPA Topics or figures of German literature or language. German texts.

GERMAN 301 Conversation and Writing Skills (3-5) VLPA Language skill development (speaking, writing) using materials selected to broaden understanding of German-speaking countries. Recommended: GERMAN 203. Offered: AW.

GERMAN 302 Conversation and Writing Skills (3-5) VLPA Language skill development (speaking, writing) using materials selected to broaden understanding of German-speaking countries. Recommended: GERMAN 301. Offered: WSp.

GERMAN 303 Conversation and Writing Skills (3-5) VLPA Language skill development (speaking, writing) using materials selected to broaden understanding of German-speaking countries. Recommended: GERMAN 302. Offered: Sp.

GERMAN 304 Contemporary German Play (5, max. 15) VLPA Reading, analysis, and performance of one play by a contemporary German author. Taught in German. Performance scheduled for last week of quarter. Prerequisite: GERMAN 203.

GERMAN 311 Critical Approaches to German Literature (5) VLPA Introduction to literary terminology. Diverse interpretive strategies, ranging from close reading to biographical and sociological approaches. Characteristics of different genres (poetry, prose, drama). Readings from eighteenth- to twentieth-century literature. Recommended: GERMAN 203. Offered: A.

GERMAN 312 Historical Approaches to German Literature (5) VLPA German literature from the Middle Ages to the present: Medieval Courtly period, Baroque, Enlightenment, *Sturm und Drang*, Classicism, Romanticism, Realism,

Neoromanticism, Expressionism. Recommended: GERMAN 311. Offered: W.

GERMAN 313 Major Figures of German Literature (5) VLPA Focus on major figure such as Goethe, Schiller, Kleist, Fontane, Thomas Mann, Kafka. Emphasis on his/her cultural and sociopolitical contexts. Literary and nonliterary texts, including film, art, political, historical, and philosophical texts. Recommended: GERMAN 203; either GERMAN 311 or GERMAN 312. Offered: Sp.

GERMAN 322 Introduction to German Studies (5) VLPA German quest for national identity and the conflict of unity and division. Readings from literature, history, politics, and anthropology. Recommended: GERMAN 203; either GERMAN 311 or GERMAN 312. Offered: W.

GERMAN 323 Institutions and Their Ideas (5) I&S/VLPA Analysis of central institutions of contemporary Germany in their historical development. Recommended: GERMAN 203; either GERMAN 311 or GERMAN 312; GERMAN 322. Offered: Sp.

GERMAN 330 Conversational German (3-5) VLPA For participants in special summer programs only.

GERMAN 333 Business German 1 (5) VLPA Introduction to the language and practices of German business. Recommended: GERMAN 203. Offered: A.

GERMAN 334 Business German 2 (5) VLPA Introduction to the language and practices of German business. Recommended: GERMAN 203. Offered: W.

GERMAN 340 Friedrich Nietzsche in English (5) I&S/VLPA Analysis of Friedrich Nietzsche's chief works and the discussion of his position within modern German literature and thought.

GERMAN 341 Franz Kafka in English (5) VLPA Short stories and novels of Franz Kafka; emphasis on philosophical relevance and esthetic significance.

GERMAN 342 Thomas Mann in English (5) VLPA

GERMAN 345 Bertolt Brecht in English (5) VLPA Brecht's life and work, particularly his plays and writings on theatre, and some poems and short prose pieces to provide additional perspective on his life and work as a whole. The development of his writing and of his ideas and attitudes.

GERMAN 346 The Contemporary German Novel in English (5) VLPA Major novels of the postwar period (1945 to present), discussed in their historical context.

GERMAN 349 Goethe in English (5) VLPA Selected major works (especially *Faust*) of Goethe, whose literary, philosophical, and scientific achievements are examined as integral parts of his quest for meaning, wholeness, and universality, and whose impact on Western thinking is traced up to Thomas Mann and C. G. Jung.

GERMAN 350 The German Drama in English (5) VLPA German drama from the eighteenth to the twentieth centuries. German history and culture as reflected in the plays. Discussion of major themes.

GERMAN 351 Vienna 1900 in English (5) I&S/VLPA Interdisciplinary study of Vienna at the turn of the century. Discussion of literary texts with emphasis on other intellectual and cultural trends of this very rich and complex period.

GERMAN 352 Literature and Society in Weimar and National Socialist Germany in English (5) I&S/VLPA Literature, theater, and film, with adjunct consideration of art and architecture, in relation to the German social and cultural situation *circa* 1918 to *circa* 1947.

GERMAN 353 Postwar Germany (5) I&S/VLPA Postwar development and present-day character of cultural, social, and political life in Germany. Readings include literary and nonliterary texts devoted to culture and everyday life. In English.

GERMAN 355 German Literature and Film in English (5) VLPA Relationship between literature and film in the German tradition. Content varies; focus may be on a particular time period, director, or theme. Special attention paid to critical and analytical skills required for interpreting the two mediums.

GERMAN 356 Pagan Germany: Myth, Religion, Folklore in English (5) I&S/VLPA History and culture of the German peoples before and during the conversion to Christianity. Readings include Tacitus's *Germania* and other historical sources, *Beowulf*, *Nibelungenlied*, *Grimm's Fairy Tales*, and German legends. Treatment of archaeological finds and a variety of materials that bear on religion, prophecy, magic, folk customs, and festivals.

GERMAN 360 Women in German Literature in English (5) I&S/VLPA Investigates the changing social roles of women in German society on the example of various literary texts from different periods.

GERMAN 370 History of German Cinema (5) I&S/VLPA History of German cinema, emphasizing the cultural and political context. Works considered include films by Lang, Murnau, Sternberg, Riefenstahl, Fassbinder, Wenders, and Trotta. Readings and discussions in English.

GERMAN 371 Special Topics: German Cinema (5, max. 10) VLPA Covers one or more German film directors, a specific genre, or a chosen theme. Topics vary.

GERMAN 390 Germanic Studies in English (5, max. 15) VLPA Topics or figures of German literature or language.

GERMAN 395 Proctoring of First-Year German Film Course (1-2, max. 6) VLPA Restricted to upper-division students of German who have demonstrated sufficient proficiency in speaking German to lead discussion groups in 150. Leaders may participate one or two hours per week and receive 1 credit for each hour in class with 6 credits allowed in 3 quarters. Credit/no credit only. Recommended: GERMAN 203. Offered: AWSp.

GERMAN 396 Proctoring of Second-Year German Film Course (1-2, max. 6) VLPA Restricted to upper-division students of German who have demonstrated sufficient proficiency in speaking German to lead discussion groups in 250. Leaders may participate one or two hours per week and receive 1 credit for each hour in class with 6 credits allowed in three quarters. Credit/no credit only. Recommended: GERMAN 303; either GERMAN 322 or GERMAN 323. Offered: WSp.

GERMAN 397 Foreign Studies in German Literature (1-6, max. 15) VLPA .

GERMAN 398 Foreign Studies in German Language (1-6, max. 15) VLPA .

GERMAN 399 Foreign Studies in German Culture (1-6, max. 15) I&S/VLPA .

GERMAN 401 Advanced Writing and Conversation (3-5) VLPA Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

GERMAN 402 Advanced Writing and Conversation (3-5) VLPA Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

GERMAN 403 Advanced Writing and Conversation (3-5) VLPA Texts and exercises, both grammatical and stylistic, to develop vocabulary, stylistic awareness, and the practical application of grammatical rules in written German. Recommended: GERMAN 303. Offered: AWSp.

GERMAN 406 Intensive Elementary Yiddish (5-15, max. 15) Intensive study of Yiddish grammar, with oral and written drills and reading of selected texts. Offered: S.

GERMAN 411 Studies in Medieval Literature and Culture (5) VLPA Rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 412 Studies in Renaissance and Baroque Literature and Culture (5) VLPA Rotating special topics in literature and culture of the Renaissance and Baroque, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 421 Studies in Eighteenth-Century Literature and Culture (5) VLPA Rotating special topics in literature and culture of the eighteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 422 Studies in Nineteenth-Century Literature and Culture (5) VLPA Rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 423 Studies in Twentieth-Century Literature and Culture: (5) VLPA Rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems. Recommended: GERMAN 303; either GERMAN 311, GERMAN 312, GERMAN 322, or GERMAN 323.

GERMAN 444 Undergraduate Thesis in Germanics (5) VLPA Supervised research leading to the writing of a research thesis.

GERMAN 446 Internship in German (2-5, max. 10) Prerequisite: 6 credits of upper-level German language courses. Credit/no credit only.

GERMAN 447 Undergraduate Research (1-5, max. 15) Supervised research with faculty member. Offered: AWSpS.

GERMAN 451 Linguistic Analysis of German (5) VLPA Recommended: GERMAN 203 Offered: A.

GERMAN 452 History of the German Language (5) VLPA Traces the history of the German language from early Germanic to the present. Recommended: LING 200 and GERMAN 203 Offered: jointly with LING 415.

GERMAN 479 Special Topics in the Teaching of Foreign Languages (3, max. 9) VLPA Intensive workshop for in-service and preservice teachers of all foreign languages on some aspect of foreign-language teaching methodology.

GERMAN 490 Contemporary German Literature (5) VLPA Interpretation of selected works by contemporary German authors. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

GERMAN 493 Special Topics in German Culture (5) I&S/VLPA Recommended: GERMAN 303; either GERMAN 322 or GERMAN 323.

GERMAN 494 Studies in German Poetry (5) VLPA Introduction to various methods of interpretation and to their practical application. Recommended: GERMAN 303; either GERMAN 311 or GERMAN 312.

GERMAN 495 Proseminar in German Literature (5, max. 15) VLPA Special topics, the subject matter and depth of which are not included in other literature courses, arranged through consultation among students and faculty members.

GERMAN 496 History of Germanic Philology (5) VLPA Introduction to the works of outstanding scholars in the field of Germanics.

GERMAN 497 Studies in German Literature (1-6, max. 15) .

GERMAN 498 Studies in the German Language (1-6, max. 15) .

GERMAN 499 Studies in German Culture (1-6, max. 15) .

GERMAN 500 Literary Theory, Methodology, and Bibliography (5) Historical survey and analysis of criticism (*Methodengeschichte*) and modern trends in contemporary theory. Methods of research and bibliography, as well as theoretical aspects of practical interpretation.

GERMAN 501 Proseminar in Methods and Writing (5) Introduction to research methods, presentation of research, scholarly writing, and general poetological issues. Each year a different special topic is chosen as a focus for students' research in the course.

GERMAN 503 Contemporary German Literature (5, max. 15) Seminar analyzing the esthetic movements and thought of contempo-

rary German literature, the social and political problems dealt with in the works of representative authors, and major experimental concepts. Some previous exposure to the German literature and civilization after 1945 is expected.

GERMAN 504 Special Studies in Literary Criticism and Theory (5, max. 15) Literary criticism and theory, focusing on special topics proposed by the instructor. Taught in English. Prerequisite: GERMAN 500 or equivalent.

GERMAN 510 Studies in Medieval Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the Middle Ages, such as particular movements, authors, genres, themes, or problems.

GERMAN 511 Studies in Renaissance and Baroque Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the Renaissance and Baroque, such as particular movements, authors, genres, themes, or problems.

GERMAN 512 Studies in Eighteenth-Century Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the eighteenth century, such as particular movements, authors, genres, themes, or problems.

GERMAN 514 Studies in Nineteenth-Century Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the nineteenth century, such as particular movements, authors, genres, themes, or problems.

GERMAN 516 Studies in Twentieth-Century Literature and Culture (5, max. 15) Seminar on rotating special topics in literature and culture of the twentieth century, such as particular movements, authors, genres, themes, or problems.

GERMAN 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/NEAR E 518/ SCAND 518/SLAV 518.

GERMAN 525 Seminar in Romanticism (5, max. 15) .

GERMAN 526 Seminar in Nineteenth-Century Drama (5, max. 15) .

GERMAN 527 Seminar in Nineteenth-Century Prose (5, max. 15) .

GERMAN 528 Nineteenth-Century Poetry (5, max. 15) Representative selections from Holderlin, the late Goethe, and from prevalent trends in nineteenth-century poetry, such as romanticism, "Young Germany," poetic realism, and the experimental poetry of naturalism.

GERMAN 529 Studies in Literature 1870-1920 (5, max. 15) Seminar on rotating special topics drawn from the period 1870-1920, such as particular movements, authors, genres, themes, or problems.

GERMAN 533 Seminar in Eighteenth-Century Literature (5, max. 15) Study of one or more of the literary movements: Enlightenment,

sentimentalism, anacreontics, storm and stress, classicism, early romanticism, and works by principal authors such as Gottsched, Bodmer, Gellert, Lessing, Wieland, Klopstock, Herder, Lenz, Goethe, Schiller, Jean Paul.

GERMAN 534 Storm and Stress (5, max. 15)

Extensive investigation of poetological and esthetic concepts advanced by initiators and exponents of German storm and stress. Analyses of narrative and dramatic works of storm and stress reveal reflections and implementations of the new theoretical concepts.

GERMAN 535 Classicism: Goethe, Schiller (5, max. 15) .

GERMAN 537 Studies in Literature 1770-1830 (5, max. 15) Seminar on rotating special topics drawn from the period 1770-1830, such as particular movements, authors, genres, themes, or problems.

GERMAN 540 Twentieth-Century Poetry (5, max. 15) Development of German poetry from Rilke, Hofmannsthal, and George through Trakl, Benn, the Expressionists and the Dadaists, Brecht, and Enzensberger, to such contemporaries as Eich, Heissenbuttel, the concrete poets, Celan, and Bachmann.

GERMAN 541 Twentieth-Century German Drama (5, max. 15) Selection from modern German drama representative of the concern with the human condition, of social criticism, and of experimentation with the new dramatic forms.

GERMAN 542 Twentieth-Century Prose (5, max. 15) Selected modern German novels, short novels, and short stories by representative authors dealing with the social and political problems of Germany as well as with individual problems of existence and identity.

GERMAN 550 Gothic (5) .

GERMAN 551 Seminar in Germanic Philology and Linguistics (5, max. 15) Topics vary. Prerequisite: basic knowledge of German and at least one elementary linguistics course.

GERMAN 552 Old High German (5) .

GERMAN 555 Old Saxon (5) .

GERMAN 556 Middle High German (5) .

GERMAN 558 Middle High German Literature (5) .

GERMAN 560 Modern Dialects (5) .

GERMAN 565 Seminar in Courtly Epic (5) Aspects and methods of literary analysis pertaining to the study of medieval courtly epics.

GERMAN 566 Late Middle High German Narrative (3) .

GERMAN 567 Minnesang (3) In-depth study of medieval German lyrics in the context of German and European literary and intellectual development. Poems of the period from Kurenberger through Walther are analyzed with stress on grammatical, formal, stylistic, and ideological interpretation. Prerequisite: adequate knowledge of Middle High German.

GERMAN 568 Seminar in Heroic Epic (5) Literary and historic problems of the German heroic epic, with special emphasis on the *Nibelungenlied* and the *Dietrichsepik*.

GERMAN 575 Teaching of German Literature and Civilization (5) Teaching of German language and literature on the advanced level in secondary schools and colleges. Credit/no credit only.

GERMAN 576 Modern Methods and Materials in Teaching German (3) Theory and practice of communicative language teaching; current developments in foreign-language teaching; evaluation of teaching materials. Credit/no credit only.

GERMAN 577 Principles of Second Language Learning (2) .

GERMAN 580 Seminar in German Literature (5, max. 15) Open topics seminar with varying content.

GERMAN 581 Seminar in Poetry (5, max. 15) Open topics seminar with varying content.

GERMAN 582 Seminar in Drama (5, max. 15) Open topics seminar with varying content.

GERMAN 583 Seminar in Prose (5, max. 15) Open topics seminar with varying content.

GERMAN 590 Philosophical Issues in German Culture (5, max. 15) Seminar on rotating special topics dealing with the impact of particular thinkers, movements, or philosophical problems in German culture.

GERMAN 591 Studies in German Intellectual History (5, max. 15) Seminar on rotating special topics dealing with interactions of history, literature, and culture in the German tradition.

GERMAN 592 Cultural Studies (5, max. 15) Seminar on rotating special topics dealing with periods, themes, or particular problems in German life and culture.

GERMAN 600 Independent Study or Research (*) .

GERMAN 700 Master's Thesis (*) .

GERMAN 800 Doctoral Dissertation (*) .

History

Ancient and Medieval History

HSTAM 203 Introduction to the Middle Ages: Medieval People (5) I&S Introduction to the Western Middle Ages through a study of social roles and statuses as seen through documents and imaginative literature. The groups studied are rulers, aristocracy, peasants, townspeople, clergy, outcasts, and outsiders.

HSTAM 205 Military History of the Ancient World (5) I&S Military history from prehistoric times to the fall of the Roman Empire, with special emphasis on the Greco-Roman period and the campaigns of Alexander the Great, Hannibal, Scipio Africanus, and Julius Caesar.

HSTAM 276 Celtic Civilizations of the European Middle Ages (5) I&S Introduction to the history and pseudo-history of medieval Ireland, Wales, Scotland, and Gaul. Topics include "Celtic" religion, mythology, social institutions, nationalism, and the relationship between history and myth. Particular attention to

how historians "do" history in the absence of straightforward historical sources.

HSTAM 290 Topics in Ancient/Medieval History (5, max. 10) I&S Examines special topics in ancient/medieval history.

HSTAM 302 Ancient History (5) I&S Political, social, economic, and cultural development of Rome from the beginnings in the eighth century BC to the beginning of the Middle Ages.

HSTAM 312 The Roman Republic (5) I&S Political, social, economic, and cultural history, with emphasis on the development of the constitution and territorial expansions.

HSTAM 313 The Roman Empire (5) I&S Political, social, and cultural history, with special emphasis on the period of Cicero and Caesar.

HSTAM 314 The World of Late Antiquity (5) I&S Examines the transformation of the ancient world from the third-century crisis of the Roman Empire to the rise of Islamic civilization. Explores the manifold political, cultural, and social changes that transformed Europe, the Mediterranean, and the Near East between the third and the eighth centuries CE.

HSTAM 315 The Byzantine Empire (5) I&S Political, social, economic, and cultural history of the eastern Roman Empire from the fourth to fifteenth centuries.

HSTAM 330 The Age of Augustus (5) I&S/VLPA Detailed study of the history and culture of the reign of Augustus, the first Roman emperor (31 BC-AD 14). Includes readings in Augustan authors such as Virgil, Ovid, and Horace as well as the study of Augustan art and architecture. Offered: jointly with CLAS 330.

HSTAM 331 Early Middle Ages (5) I&S The Dark Ages, feudalism, emergence of the medieval order of civilization, and the development of Romanesque culture.

HSTAM 332 Central Middle Ages (5) I&S Europe in the central Middle Ages: culture of cathedrals and universities, formation of national states, development of urban society.

HSTAM 333 Late Middle Ages (5) I&S Disintegration of the medieval order under the impact of the national state, the secularization of society, and the decline of the church. Movements of reform and revolution. The culture of late gothic Europe.

HSTAM 340 Medieval Women (5) I&S The experiences of women in medieval society: public and private power, changing concepts of family and the domestic sphere, ideal and reality in courtly love, women in religious life, women in the workplace, the *querelle des femmes* and the beginnings of "feminist" thought.

HSTAM 360 Medieval Christianity (5) I&S Development of Christianity in the medieval west circa 400 to 1500. Emphasis on the forms of religious life: monasticism, the papacy, friars, hermits, mystics, and reformers; and on the emergence of new modes of piety, both lay and clerical.

HSTAM 365 Medieval England, 1042-1485 (5) I&S Upper level survey of English history from the Norman conquest until 1485. Emphasis on political, social, and economic history, with special attention to the peculiarities of English development as these had emerged by 1485.

HSTAM 367 Medieval Jewish History (5) I&S Social and intellectual history of the Jews in western Europe to the fifteenth century. Jews under Islam and Christianity; the church and the Jews; the Crusades and their legacy; intellectual achievements; conflict and cooperation. Offered: jointly with SISJE 467.

HSTAM 370 The Vikings (5) I&S/VLPA The Vikings at home in Scandinavia and abroad, with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered: jointly with SCAND 370.

HSTAM 401 Early Greece (5) I&S Bronze and Dark Age Greece: realities of the heroic age of ancient Greece.

HSTAM 402 Classical Greece (5) I&S The classical civilization of ancient Greece, with special emphasis on the legacy of Greece to Western civilization.

HSTAM 403 Alexander the Great and the Hellenistic Age (5) I&S Rise of Macedonia, conquest of Near East by Alexander, and division into lesser kingdoms after Alexander's death. Special emphasis on fusion of cultures and change from city-state to world-state.

HSTAM 443 Kievan and Muscovite Russia: 850-1700 (5) I&S Development of Russia from earliest times to the reign of Peter the Great. Offered: jointly with SISRE 443.

HSTAM 490 Topics in Ancient/Medieval History (5, max. 10) I&S Examines special topics in ancient/medieval history.

HSTAM 501 Greek History Field Course (3-6, max. 6) Examines various topics and themes in Greek history. Content varies.

HSTAM 511 Roman History Field Course (3-6, max. 6) Examines various topics and themes in Roman history. Content varies.

HSTAM 512 Seminar in Ancient History ([3-6, max. 6]-) Detailed study of special topics in ancient history.

HSTAM 513 Seminar in Ancient History (-[3-6, max. 6]) Detailed study of special topics in ancient history.

HSTAM 518 Topics in Late Antiquity (3-6, max. 18) Examines various topics in the transformation of the ancient world from the third-century crisis of the Roman Empire to the rise of Islamic civilization. Serves as the field course for masters and Ph.D. students.

HSTAM 530 Early Middle Ages (3-6, max. 6) Field course. Survey of early European history through the times of tribal migrations and invasions from Asia. Problems and methods of research.

HSTAM 531 Medieval European History (3-6, max. 6) .

HSTAM 532 Medieval European Seminar (3-6, max. 6) Prerequisite: reading knowledge of Latin.

HSTAM 533 Medieval European Seminar (3-6, max. 6) Prerequisite: reading knowledge of Latin.

HSTAM 534 Medieval European Seminar (3-6, max. 6) Prerequisite: reading knowledge of Latin.

HSTAM 535 Later Medieval Europe (3-6, max. 6) Field course. Surveys European history from

ca. 1250 to 1500, with particular attention to historiography.

HSTAM 536 Topics in Early Medieval History (3-6, max. 6) Graduate level study of specific topics in early medieval history. Topics vary from quarter to quarter; for information, please see instructor.

HSTAM 590 Topics in Ancient and Medieval History (5) Seminar on selected topics in ancient and medieval history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

History

HIST 111 The Ancient World (5) I&S Origins of Western civilization to the fall of Rome.

HIST 112 The Medieval World (5) I&S Political, economic, social, and intellectual history of the Middle Ages. Cannot be taken for credit toward a history major if HSTAM 331 or 332 or 333 previously taken.

HIST 113 Europe and the Modern World (5) I&S Political, economic, social, and intellectual history of modern Europe. Cannot be taken for credit toward a history major if HSTAM 302 or 303 previously taken.

HIST 140 Russia from the Tenth Century to the Present (5) I&S Russian political, social, and economic history from the tenth century to the present. Offered: jointly with EURO140.

HIST 151 Introduction to African History, c. 1000-1880 (5) I&S Examines Africa's past from approximately 1000 to 1880. Through the theme of the politics of wealth, explores the history of precolonial states and societies, religious movements that combined local beliefs with Islam and Christianity, the Atlantic and Indian Ocean slave trades, and the origins of American and European colonialism.

HIST 152 Introduction to African History, c. 1880 - Present (5) I&S Examines Africa's pasts from approximately 1880 to the present. Through the theme of the politics of wealth, explores the history of European colonization, African social and cultural life under colonial rule, anti-colonial movements and decolonization, and the changes and challenges of the postcolonial present.

HIST 161 Survey of the Muslim Near East (5) I&S The Middle East (the Arab countries, Israel, Turkey, Iran, and Afghanistan) from the emergence of Islam in AD 622 to the present: culture, economics, politics.

HIST 199 Foreign Study (3-5, max. 10) I&S Lower-division history courses, for which there are no direct University of Washington equivalents, taken through the University of Washington Foreign Study Program.

HIST 200 Ten Events that shook the World (5) I&S Offers introduction to history by examining ten events of great importance for both past and present. The ten events, which vary from quarter to quarter, come from diverse times and places, thereby encouraging a sweeping view of world history. (See department advisor for the current quarterly list of the ten events.).

HIST 204 Europe and America in the Era of the World Wars (5) I&S Declining role of Europe in the world and rise of the United States from 1914 to 1945.

HIST 205 Filipino Histories (5) I&S Explores the histories, cultures, and politics of Filipinos in the Philippines and in the Diaspora, including Filipino Americans. Examines pre-colonial societies, Spanish and American colonial rule, nationalism, decolonization, and post-war political movements. Includes the histories of Filipino peoples in Europe and the United States.

HIST 207 Introduction to Intellectual History (5) I&S Ideas in historical context. Comparative and developmental analysis of Western conceptions of "community," from Plato to Freud. Offered: jointly with CHID 207.

HIST 209 History of Christianity (5) I&S Twenty centuries of the history, thought, and culture of Christianity.

HIST 211 Introduction to the History of Science (5) I&S Introduction to major themes in the history of science. Investigation of historical and scientific methods through the study of particular historical cases.

HIST 215 The History of the Atomic Bomb (5) I&S History of the atomic bomb from the beginning of nuclear physics to the security hearing of J. Robert Oppenheimer. Includes a study of the scientific achievements that made the bomb possible, the decision to deploy the bomb, the moral misgivings of the scientists involved.

HIST 217 The Space Age (5) I&S Explores the history of ideas, events, and practices associated with the Space Age from the late nineteenth century through the twentieth. Emphasizes intellectual, cultural, and political/military history in the development of rockets and space technology in the United States, Germany, and the Soviet Union.

HIST 219 Science and the Arts in Early Modern Europe (5) I&S Explores the role of artisanal craft practice and knowledge in the Scientific Revolution. Examines the artisanal world and its traditions of craft knowledge and follows the transmission of artisanal practice into the scholarly world of natural philosophy in the seventeenth century. Assesses the consequences for scientists and artisans.

HIST 221 Information Research Strategies in History (3) I&S Information research and problem solving in the context of history. Focuses on identifying information, need, information seeking, evaluation and presentation, and selection of the appropriate sources. Offered: jointly with INFO 221.

HIST 222 Understanding Photographs as Historic Documents (3) I&S/NW Introduction to understanding how to view and interpret information contained in photographs. Examines the photograph as artifact, intent of the photographer, photographic codes and meanings; how such information is used, misused, and manipulated for various purposes and how to navigate archival institutions in search of photographs. Offered: jointly with INFO 222.

HIST 225 The Silk Road (5) I&S *Waugh* History of cultural and economic exchange across Eurasia from the early Common Era to modern times. Spread of religions such as Islam and Buddhism, overland trade in rare commodities, interaction between nomadic and sedentary cultures, role of empires, culture of daily life, and the arts. Offered: jointly with SIS 225.

HIST 245 Exploration and Empire: Science, Art, and Power, 1300-1800 (5) I&S Explores key moments in the history of exploration and empire, 1300-1800. Taking an interdisciplinary approach, focuses on scientific and artistic aspects of exploration, their implications for imperialism, and legacies in the postcolonial world.

HIST 249 Introduction to Labor Studies (5) I&S Conceptual and theoretical issues in the study of labor and work. Role of labor in national and international politics. Formation of labor movements. Historical and contemporary role of labor in the modern world. Offered: jointly with POL S 249/SOC 266.

HIST 250 Introduction to Jewish Cultural History (5) I&S Introductory orientation to the settings in which Jews have marked out for themselves distinctive identities as a people, a culture, and as a religious community. Examines Jewish cultural history as a production of Jewish identity that is always produced in conversation with others in the non-Jewish world. Offered: jointly with SISJE 250.

HIST 254 European Colonialism in North Africa, 1830 to the Present (5) I&S Examines European colonialism in North Africa, life under colonial domination, influences of Islam, rise of nationalism, struggles for independence, and the legacy of this relationship on contemporary conflicts of immigration, religion, and cultural identity. Focuses on Algeria and France, but also considers Britain, Germany, Italy, Libya, Morocco, Spain, and Tunisia.

HIST 260 Slavery in History: A Comparative Study (5) I&S Slavery as a universal historical phenomenon lending itself to a comparative analysis is studied in terms of its philosophical justifications, economic importance, and local practices. The following historical periods are surveyed: the ancient Near East, Greece, Rome, Islam, Africa, Latin America, and North America.

HIST 269 The Holocaust: History and Memory (5) I&S Explores the Holocaust as crucial event of the twentieth century. Examines the origins of the Holocaust, perpetrators and victims, and efforts to come to terms with this genocide in Europe, Israel, and the United States. Offered: jointly with SISJE 269.

HIST 283 Introduction to Women's History (5) I&S Includes units on American, European, and Third World women that examine centers of women's activities (convents, women's clubs), women's place in male-dominated spheres (politics), women's impact on culture (health, arts), and the effect of larger changes on women's lives (technology, colonization). Offered: jointly with WOMEN 283.

HIST 290 Topics in History (5, max. 10) I&S Examines special topics in history.

HIST 310 Science and Religion in Historical Perspective (5) I&S Scientific and religious ideas have been two of the major forces shaping our modern view of the world. Often regarded as being in conflict, they can equally well be seen as complementary and interdependent. Study of the relationship between scientific and religious ideas with focus on particular episodes of history from ancient to modern times.

HIST 311 Science in Civilization: Antiquity to 1600 (5) I&S From preclassical antiquity to the end of the Middle Ages, stressing the growth of scientific ideas, the cultural context in which they

take shape, and their relationship to other movements of thought in the history of civilization.

HIST 312 Science in Civilization: Science in Modern Society (5) I&S Growth of modern science since the Renaissance, emphasizing the scientific revolution of the seventeenth century, the development of methodology, and the emergence of new fields of interest and new modes of thought.

HIST 313 Science in Civilization: Physics and Astrophysics Since 1850 (5) I&S/NW Organization and pursuit of the physical and astrophysical sciences, focusing on the major unifying principles of physics and astronomy and the social and cultural settings in which they were created. Offered: jointly with ASTR 313.

HIST 315 History of Technology to 1940 (5) I&S Technology since the Middle Ages, in its social and historical contexts. From the medieval foundations of metal working, its social consequences and the establishment of a class of engineering practitioners, to the transformation of American rural life, domestic technology, and industry before World War II.

HIST 320 Greek History: 7000 BC to Present (5) I&S History of Greece from its Neolithic village origins to the present. Examines the different forms of one of the most resilient cultures in the human story. Offered: jointly with EURO 320.

HIST 345 War and Society (5) I&S Analysis of the techniques of war from the Renaissance to the present with consideration of the social, political, and economic consequences of war in the Western world.

HIST 346 Images of War in History, Literature, and Media (5) I&S/VLPA Explores images of war generated by historians, writers, artists, filmmakers, television producers, and journalists, analyzing the perspectives on war adopted by various observers to see what motivates their representations. Focuses on ways in which various media shape images of war and the effect of this shaping on human consciousness.

HIST 361 Middle Eastern History, 1453-1800 (5) I&S Schwarz Introduction to the early modern period in the Middle East, including an exploration of the political, economic, and cultural dominance of the Ottoman Empire and Safavid Iran. Explores the political and social dynamics and economic transformations of the two empires. Offered: A.

HIST 369 The Jewish Twentieth Century in Film (5) I&S Stein Surveys twentieth-century Jewish history in its European, American, and Middle Eastern contexts by examining films produced in these settings. Considers central events that shaped modern Jewish culture: the changing geography of Europe and the Middle East, mass migrations, the Holocaust, shifting meanings of race, culture, and religion. Offered: jointly with SISJE 369.

HIST 388 Colloquium: Introduction to History (5, max. 10) I&S Introduction to the discipline of history for new or prospective majors. Emphasizes the basic skills of reading, analysis, and communication (both verbal and written) that are central to the historian's craft. Each seminar discusses a different subject or problem.

HIST 390 Colloquium in History and Science (5) I&S Study in the history of science to bridge the gap between the natural sciences and the humanities. Students should have a strong background both in history and in a natural science.

HIST 395 Modern Historical Writing, Honors Seminar (5) I&S New types of problems examined by historians and new techniques that have evolved for solution. Brief historiographical introduction, reaching back to the "scientific" historians of the mid-nineteenth century, then continues by examining the impact on historians of new disciplines such as psychology, sociology, and economics, and of new techniques such as statistics and prosopography. Readings are in the theorists and in those who followed their lead. Admission by departmental invitation only.

HIST 399 Advanced Foreign Study (3-5, max. 15) I&S Upper-division history courses, for which there are no direct University of Washington equivalents, taken through the University of Washington Foreign Study Program.

HIST 403 Scandinavian Immigration in History and Literature (5) VLPA/I&S History and literature of Scandinavian immigration to North America, including immigrant life and culture, community structures and traditions, and the literature about and by immigrants from Denmark, Finland, Iceland, Norway, and Sweden. Offered: jointly with SCAND 403.

HIST 412 Science and the Enlightenment (5) I&S The role of science in relation to intellectual, social, economic, and religious forces in the eighteenth century, and growth of the international community in science during the same period.

HIST 420 The Olympics: The Merging of Old and New in Modern Greece (5) I&S Explores the role of the Olympic games in the history and culture of Greece, from Bronze Age pre-Olympiads to the 2004 Athens Games. Topics include mythical and historical origins of the Olympics, moral principles and practices in Greek sports, and modern Olympics, 1896 to 2004. Offered: jointly with EURO 420.

HIST 425 History of the British Empire and Commonwealth Since 1783 (5) I&S Britain in the Caribbean, Africa, India, Southeast Asia, and the Pacific; and the settlement, economic development, and political evolution of Canada, Australia, New Zealand, and South Africa.

HIST 449 Issues in Comparative Labor History (5) I&S Role of labor in the modern world. Emphasis on the centrality of workers' struggles in the evolution of national societies on the conceptual, research, and expository strategies of contemporary students of the labor movement and on differences and relationships between labor in developed and underdeveloped countries.

HIST 451 Eastern and Central Africa Since 1500 (5) I&S Explores the history of Eastern and Central Africa from the period prior to the slave trade through European colonialism to the post-colonial present. Focuses on political, economic, and social change and continuity. Emphasis on understanding how various historical actors and historians have interpreted these processes.

HIST 452 Southern Africa Since 1500 (5) I&S Explores the history of Southern Africa from pre-colonial social institutions through European

colonialism and industrialization to the post-apartheid present. Focuses on the interplay between race, class, ethnicity, and gender in the structuring of political relations. Emphasis on understanding how various historical actors and historians have interpreted these processes.

HIST 457 Topics in Labor Research (5, max. 10) I&S Analysis of the post-World War II decline of national labor movements and strategies employed to reverse this trend. Requires a major research project on organizing, bargaining, or another question in labor studies. Prerequisite: either POL S 249, HIST 249, or SOC 266. Offered: jointly with POL S 457.

HIST 461 History of the Middle East: 622-1300 (5) I&S Political and economic analysis of the period circa AD 600, preliminary to rise of Islam, to arrival of the Turks. Muhammad's teaching and impact; Islamization and Arabization.

HIST 462 History of the Middle East: 1258-1798 (5) I&S Conquests by successors of Ghengis Khan; creation in Egypt, Syria, and Iran of cavalry-based states; domination of political, social, and economic history by Ottoman and Safavid empires. The Napoleonic invasion.

HIST 463 History of the Middle East Since 1789 (5) I&S Critical issues and themes in the changing Middle East, including Westernization, growth of nationalism, Arab-Israeli dispute, Iranian revolution, and the role of Islam.

HIST 467 Nations and States in the Modern World (5) I&S Development of national consciousness in the "old nations" of Europe before the French Revolution. Replacement by new nationalism, spreading into East Central Europe, Russia, Ibero-America, Asia, and Africa. Offered: jointly with SIS 467.

HIST 474 Special Topics in History for Teachers (1-10, max. 10) I&S Credit/no credit only.

HIST 481 Economic History of Europe (5) I&S Origins of the modern European economy; historical analysis of economic change and growth from medieval times that stresses the preconditions and consequences of industrialization. Recommended: ECON 201. Offered: jointly with ECON 460.

HIST 485 Comparative Colonialism (5) I&S Rafael Explores the historic roots and practices of colonialism throughout the world, focusing on the roles of nationalism, cosmopolitanism, and imperial domination. Treats colonialism as a world event whose effects continue to be felt and whose power needs to be addressed. Offered: S.

HIST 490 Topics in History (5, max. 10) I&S Examines special topics in history.

HIST 491 Honors Historical Method (5-) I&S The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

HIST 492 Honors Historical Method (-5) I&S The purposes, materials, and techniques of historical scholarship. Theory, practice, and criticism. For honors students.

HIST 493 Senior Thesis in the History of Science (5, max. 10) I&S Preparation of the senior thesis for the History and Science emphasis.

HIST 494 Colloquium in Historiography (5, max. 15) I&S Advanced seminar examining central issues in historiography. Emphasizes reading, discussion, and writing.

HIST 495 History Internship (1-5, max. 10) Off-campus independent fieldwork with a community agency in an apprenticeship or internship situation. Work to be jointly supervised by a member of the History Department and an on-site field supervisor.

HIST 498 Colloquium in History (5, max. 15) I&S Each seminar examines a different subject or problem. A quarterly list of the seminars and their instructors is available in the Department of History undergraduate advising office.

HIST 499 Undergraduate Research (1-5, max. 15) .

HIST 501 Ancient Greece and Rome: Writings and Interpretations (3-6, max. 6) Study of historians, development of historical study as a distinct pursuit, focus of attention in historical scholarship in the ancient world and comparison with modern interpretation of antiquity.

HIST 502 Medieval Europe: Writings and Interpretations (3-6, max. 6) Study of historians, schools of history, and interpretations of medieval European history.

HIST 503 Modern Europe: Writings and Interpretations (3-6, max. 6) Study of historians, schools of history, and interpretations of modern European history.

HIST 504 Comparative Ethnicity and Nationalism (5) Theoretical approaches to, and historical case studies of, the phenomena of ethnicity, nationalism, and ethnic conflict in the modern world. Emphasis on Europe and Asia.

HIST 511 History of Science (3-6, max. 6) .

HIST 512 Seminar in the History of Science ([3-6, max. 6]-) .

HIST 513 Seminar in the History of Science (-[3-6, max. 6]-) .

HIST 514 Seminar in the History of Science (-[3-6, max. 6]) .

HIST 515 Field Course in the History of Technology (5) Introduces students to the literature, methodology, and problems of the history of technology, and prepares them for independent study in the field.

HIST 530 Comparative Colonialisms: Methodological and Conceptual Approaches (5) Introduces students to the historiography of modern European/American colonialisms, focusing on Africa, Asia, and/or the Americas. Addresses methodological and conceptual issues by examining relationship between capitalism and colonialism; violence and routinization of colonial power; colonial categories of race, ethnicity, class, and gender; and resistance movements and nationalist politics.

HIST 552 Field Course in African History (5) Methodological and conceptual issues in African historiography, focusing on 1500 to the present. Examines topics including pre-colonial politics and economics, slavery and the slave trades, European conquest and colonization, resistance movements and nationalist politics, and post-

colonial debates and dilemmas. Special attention to issues of gender, race, ethnicity, and class.

HIST 561 Islamic History (3-6, max. 6) Field course. Introduction to advanced study in the major periods and problems of Islam. Bibliographical guidance is stressed.

HIST 562 Ottoman History (3-6, max. 6) Field course. Introduction to the major periods and problems of Ottoman history, 1300-1914, by acquainting the student with the major works in at least two languages. An attempt is made to teach some use of Ottoman materials. A minor problem is investigated in detail by every student. Prerequisite: knowledge of at least one major language besides English (French, German, Russian, or other).

HIST 563 Modern Near East (3-6, max. 6) Field course introducing the student to the major periods and problems of Near Eastern history, 1798 to the present.

HIST 570 Topics in Teaching History (3) Topics include active learning, teaching writing, assessment, and course design. Designed for history graduate students working or planning to work as TAs or instructors. Students produce a teaching portfolio and conduct peer observations. Credit/no credit only.

HIST 571 Orientation to an Academic Career in History (3) Course for prospective college and university history instructors, preparing them for the nonacademic aspects of their duties. Prerequisite: Master of Arts degree in history or permission of instructor.

HIST 580 Gender and History (5) Introduction to gender as category of historical analysis, examining the impact of feminist theory within the discipline of history. Course traces historiographical debates in women's and gender history and explores, through cross-cultural comparisons, how scholars have conceived the relationship between gender and categories such as class, race, ethnicity, and sexuality.

HIST 590 Topics in History (5, max. 15) Seminar on selected topics in general history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

HIST 595 Historical Practices (5) Emphasizes the interrelatedness of theoretical issues and historical research. Students read works that encourage the rethinking of sources and their historical meaning and experiment with sources, methods, and questions in a set of practical assignments.

HIST 598 Methods of Historical Research (5) Exploration of new historical and scholarly techniques employed in historical research. Use of social science methodology and literary theory in the evaluation and interpretation of historical sources. Use of feminist theory, deconstruction, critical theory, and orality/literacy studies. Student research paper is based upon a chosen theoretical approach.

HIST 600 Independent Study or Research (*) .

HIST 700 Master's Thesis (*) .

HIST 800 Doctoral Dissertation (*) .

History of Asia

HSTAS 200 South Asian History, Pre-History to the Present (5) I&S Explores history of the modern nations of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, Afghanistan, and the Maldives from pre-history to the present. Addresses development of religious systems, arrival of Islam, relations between religious and ethnic communities, and creation of states and empires in South Asia.

HSTAS 201 Ancient Indian Civilization (5) I&S Religions, literature, philosophy, politics, arts, and history of India from earliest times to the Mughal empire.

HSTAS 202 Modern Indian Civilization (5) I&S The Islamic impact, British conquest, and contemporary India. Emphasis on the rise of nationalism, social organization, and contemporary life and history.

HSTAS 211 History of Chinese Civilization (5) I&S Intensive survey of Chinese civilization from earliest times to today. Introduces all students, including East Asian history majors, to the general sweep of Chinese history. Social, cultural, and intellectual developments.

HSTAS 212 History of Korean Civilization (5) I&S From earliest times to the present. Development of Korean society and culture in terms of government organization, social and economic change, literature, and art. Offered: jointly with SISEA 212.

HSTAS 221 History of Southeast Asia (5) I&S Surveys Southeast Asian civilizations at the outset of Western colonial rule; the colonial impact on the traditional societies of Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Indonesia, and the Philippines; nineteenth- and twentieth-century nationalist and revolutionary movements; emergence of Southeast Asia as a region in the modern world. Offered: jointly with SISSE 221.

HSTAS 241 Japanese Civilization (5) I&S Japan's civilization, including its origins, government, literature, economic institutions, material culture, social organization, and religions, in relation to the development of Japan as a society and nation. Cannot be taken for credit if SISEA 341 previously taken. Offered: jointly with SISEA 241.

HSTAS 244 Imperialism and Anti-Colonialism in Asia (5) I&S Introduction to Western imperialism expansion, conquest, and colonial rule in Asia; the anti-colonial, nationalist resistances they engendered; and the resultant cultural, political, economic, and intellectual transformations in Asian societies. Covers post-1800 violence, racial hierarchies, human rights abuses, post-colonial memories, persistent strategies of domination, and structural inequities. Offered: jointly with SISA 244.

HSTAS 245 Human Rights in Asia (5) I&S *Callahan, Giebel* Introduction to recent and ongoing human rights issues in South, Southeast, and East Asia. Focuses on how human rights politics have played out in domestic political arenas. Provides exposure to views/insights into the historical context in which human rights claims, abuses, and debates arise. Offered: jointly with SISA 245.

HSTAS 265 The Viet Nam Wars (5) I&S *Giebel* Recent Vietnamese history and struggles for

independence and national unification *vis-a-vis* French colonialism, Japanese occupation, American intervention, and internal divisions. Covers historical roots and contemporary contexts of revolution and war, objectives and motivations of participants, and the enormous human costs. Emphasizes socio-cultural changes and wars' legacies. Offered: jointly with SISSE 265.

HSTAS 290 Topics in Asian History (5, max. 10) I&S Examines special topics in Asian history.

HSTAS 348 Alternative Routes to Modernity (5) I&S Routes to modernity followed by non-Western societies between 1600 and 1900. Historical experiences of non-Western societies seen in the contexts of European history and of development theory. Primary sources and techniques for posing theoretical questions of historical data. Offered: jointly with SIS 348.

HSTAS 401 History of Ancient India (5) I&S India in ancient times; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 402 History of Medieval and Mughal India (5) I&S Medieval India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 403 History of Modern India to 1900 (5) I&S Modern India; emphasis on forms of political organizations and economic life, social organizations, and cultural developments.

HSTAS 404 History of Twentieth-Century India (5) I&S Analysis of the problems in the fields of social life, international and domestic politics, education, economics, and other areas that confront India today.

HSTAS 423 History of Modern Japan (5) I&S Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly with SISEA 423.

HSTAS 424 The Emergence of Postwar Japan (5) I&S The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with SISEA 440.

HSTAS 441 Economic and Social History of Japan to 1900 (5) I&S Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341. Offered: jointly with SISEA 441.

HSTAS 451 Chinese History: Earliest Times to 221 BC (5) I&S Preimperial China.

HSTAS 452 Chinese History from Earliest Times to 1276(5) I&S Traces the development of Chinese civilization from earliest times through the Song dynasty. Examines social, cultural, political, and economic history.

HSTAS 453 Chinese History: AD 906 to 1840 (5) I&S Political, social, economic, and

intellectual history from the time of the Mongol conquest of China to the Sino-Japanese war. Focus on the evolution of the late imperial Chinese state and the "early modern" era in China.

HSTAS 454 History of Modern China (5) I&S Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with SISEA 454.

HSTAS 456 Topics in Chinese Social History (5) I&S Surveys major issues and approaches to the study of the role of the Chinese people in China's historical development. Historical focus of course varies with instructor. Recommended: HSTAS 211, HSTAS 452, HSTAS 453, or HSTAS/SISEA 454. Offered: jointly with SISEA 456.

HSTAS 457 Women in China to 1800 (5) I&S Gender in Chinese culture, women's situations in the patrilineal family system, and the ways women's situations changed as other dimensions of China's political system, economy, and culture changed from early times through the nineteenth century. Offered: jointly with WOMEN 457.

HSTAS 459 Gender Histories of Modern China, 18th to 20th Centuries (5) I&S Emergence of modernist social, political, intellectual gender formations in social activism, revolutionary writing, scientific ideologies, economic globalization. Stresses gender difference in colonial modernity, revolutionary movement, communism, post-socialist market society. Relates modern Chinese women to global flows, new division of labor, local and regional experience. Offered: jointly with WOMEN 459.

HSTAS 460 Cities in China: Past and Present (5) I&S Economic, political, social, and cultural functions of the city in modern Chinese history. Changes in China's urban system. The city as cultural center and focus of literary and cinematic representation. Attention to architecture, commerce, urbanization, the role of capital cities in the power of the state. Offered: jointly with SISEA 460.

HSTAS 462 Southeast Asian History to 1800 (5) I&S Absorption and modification of cultures (Indian and Chinese), religions (Islam, Buddhism, Catholicism), and peoples (northern European) by island- and mainland-Southeast Asians. Main themes are cultural contact and the growth of states and peoples.

HSTAS 463 Southeast Asian History from 1800 to the Present (5) I&S Post-eighteenth-century history of the present countries of Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore, Brunei, Indonesia, and the Philippines. Deals with colonial rule, emerging nationalism, and political independence. Investigates broad themes of social, economic, and cultural history.

HSTAS 466 Islam, Mysticism, Politics and Performance in Indonesian Culture (5) VLP/A I&S Examines how Indonesia, the world's fourth most-populous country, with the largest Islamic population, weaves together local practices and influences from India and Persia. Offers ways of understanding modern Indonesian performing arts, religion, and politics. Offered: jointly with SISSE 446.

HSTAS 481 History of Traditional Korea: Earliest Times to the Nineteenth Century (5) I&S Korean history from earliest times to the modern period.

HSTAS 482 History of Modern Korea: 1860 to the Present (5) I&S Traditional institutions and society, Japanese colonial rule, liberation and the Korean War, early Korean communist movement, and North Korea and South Korea since 1945.

HSTAS 490 Topics in Asian History (5, max. 10) I&S .

HSTAS 501 Indian History (3-6, max. 6)
Prerequisite: permission of instructor.

HSTAS 502 Seminar: History of India (3-6, max. 12) Seminar on selected topics and problems in the history of medieval and modern India. Prerequisite: HSTAS 501 and permission of instructor.

HSTAS 503 Seminar: History of India (3-6, max. 12) Seminar on selected topics and problems in the history of medieval and modern India. Prerequisite: HSTAS 501 and permission of instructor.

HSTAS 520 Premodern Japanese History (5) Field course; Japanese history prior to 1868. Prerequisite: HSTAS 421 and HSTAS 422, or SISEA 441 and SISEA 541, or permission of instructor.

HSTAS 521 Modern Japanese History (3-6, max. 6) Field course. Prerequisite: HSTAS 422, HSTAS 423, or permission of instructor.

HSTAS 530 Field Course in Southeast Asian History (5) Introduction to major English-language works on Southeast Asian history and to the major historiographical issues of the era.

HSTAS 532 Seminar in Southeast Asian History (5) Selected topics in Southeast Asian history and historiography. Preparation for theses and doctoral dissertations on Southeast Asian History.

HSTAS 541 Economic and Social History of Japan to 1900 (5) Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken HSTAS 441. Offered: jointly with SISEA 541.

HSTAS 546 Gender and Colonialism in Eastern Asia (5) Economic-political colonialization, post colonialism, and statist-gendered citizenship; intra-Asian subimperialism structuring domestic production, family, and gendered subjectivities; humanism and the New Woman; modern contests over new masculinity and new femininity; and the effect of war, imperialist occupation and colonial modernity on interregional flows of ideas, labor, capital, and jurisprudence. Offered: jointly with WOMEN 546; AWSpS.

HSTAS 547 Gender and the New International Division of Labor in Asia Pacific (5) Shift of the dynamic relation of gender, state, and citizens from modernization (national development) to globalization (intra-regional development) strategies in Pacific Asia, 1945 to present. Consumption, service provision, migratory labor, intra-Asian investment, localization. Offered: jointly with WOMEN 547.

HSTAS 551 Field Course in Chinese History: Pre-Sung Period (3-6, max. 6) Ebrey
Introduction to the English-language literature on Chinese history through the Song dynasty. Recommended: HSTAS 452 or equivalent.

HSTAS 552 Seminar in Chinese History: Earliest Times to 1276 ([3-6, max. 12]-) Ebrey
Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 553 Seminar in Chinese History: Earliest Times to 1276 (-[3-6, max. 12]-) Ebrey
Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 554 Seminar in Chinese History: Earliest Times to 1276 (-[3-6, max. 12]) Ebrey
Methods and materials for research in early imperial Chinese history. Prerequisite: reading knowledge of classical Chinese. Recommended: HSTAS 452, HSTAS 550, or HSTAS 551, or equivalent.

HSTAS 560 Field Course in Chinese History: 1276-1895 ([3-6, max. 6]-) Guy Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

HSTAS 561 Field Course in Chinese History: 1276-1895 (-[3-6, max. 6]) Guy Introduction to the English-language literature on the Yuan, Min, and Qing dynasties. Recommended: HSTAS 453 or equivalent.

HSTAS 562 Seminar in Chinese History: 1268-1895 ([3-6, max. 6]-) Guy Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 563 Seminar in Chinese History: 1268-1895 (-[3-6, max. 6]-) Guy Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 564 Seminar in Chinese History: 1268-1895 (-[3-6, max. 6]) Guy Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 572 Seminar in Twentieth Century Chinese History (-[3-6, max. 6]) Dong Materials and methods for research in imperial Chinese history. Prerequisite: reading knowledge of Chinese. Recommended: HSTAS 453, HSTAS 560, HSTAS 561, or equivalent.

HSTAS 573 Seminar in Twentieth Century Chinese History ([3-6, max. 12]-) Dong Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

HSTAS 574 Seminar in Twentieth Century Chinese History (-[3-6, max. 12]-) Dong Materials and methods for research in twentieth-century Chinese history. Prerequisite: knowledge of Chinese and permission of instructor.

HSTAS 575 Seminar in Chinese History: Modern Period (-[3-6, max. 12]) Research seminar in modern Chinese history. Training in the materials and methods of research, and preparation of extended research papers. Prerequisite: HSTAS 571-572 or permission of instructor and reading knowledge of Chinese.

HSTAS 581 Modern Korean History (3-6, max. 6) Field course. Prerequisite: permission of instructor.

HSTAS 582 Seminar in Korean History ([3-6, max. 6]-) Selected topics in Korean history and historiography.

HSTAS 583 Seminar in Korean History (-[3-6, max. 6]-) Selected topics in Korean history and historiography.

HSTAS 584 Seminar in Korean History (-[3-6, max. 6]) Selected topics in Korean history and historiography.

HSTAS 590 Topics in History (5, max. 15) Seminar on selected topics in general history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

History of the Americas

HSTAA 101 Survey of the History of the United States (5) I&S Supplies the knowledge of American history that any intelligent and educated American citizen should have. Objective is to make the student aware of his or her heritage of the past and more intelligently conscious of the present.

HSTAA 105 The Peoples of the United States (5) I&S Surveys American diversity since 1500. Repeopling of America through conquest and immigration by Native Americans, Europeans, Africans, Asians, and Latin Americans. Contributions of various peoples and the conflicts between them, with special attention to changing constructions of race and ethnicity and evolving understandings of what it means to be American.

HSTAA 150 Introduction to African-American History (5) I&S Introductory survey of topics and problems in Afro-American history with some attention to Africa as well as to America. Provides some general knowledge and serves as a basic introductory course for a sequence of lecture courses and seminars in Afro-American history. Offered: jointly with AFRAM 150.

HSTAA 185 Introduction to Latin American History: From Columbus to Castro (5) I&S Survey of political, economic, and social history of Latin America from the Iberian conquest to the present. Lectures, discussions, and films focus on developing understanding of Latin America's current problems through study of their historical roots. Designed for the beginning student and the nonspecialist.

HSTAA 202 Makers of American Foreign Policy, 1776 to the Present (5) I&S Survey of the history of American foreign relations. Focus on the individuals responsible for initiating new foreign policies or for realigning old ones.

HSTAA 205 Asian American History (5) I&S Introductory history of Asian Indians, Chinese, Filipinos, Japanese and Koreans in the United States from the 1840s to the 1960s. Major themes include imperialism, labor migration, racism, community formation, and resistance.

HSTAA 212 The Military History of the United States From Colonial Times to the Present (5)

I&S Development of American military policies, organizational patterns, tactics, and weaponry, from beginnings as a seventeenth-century frontier defense force to the global conflicts and military commitments of the twentieth century. Interaction and tension between need for an effective military force and concept of civilian control of that force.

HSTAA 215 American South from the Revolution through the Civil War (5) I&S

Kleit Explores the history of the American South from the American Revolution through the Civil War, from a successful revolution to one that met defeat. Attention given to the diversity of people and changes over space and time. Offered: Sp.

HSTAA 221 Environmental History of the U.S. (5) I&S

Survey of the relationship between nature and human history, including the impact of the non-human environment on American history and the environmental effects of colonization, urbanization, and consumerism; the cultural construction of nature in different eras and its social implications; the sources and limits of modern environmental politics.

HSTAA 225 American Slavery (5) I&S

Explores the making of American slavery from beginnings on the African coast to the plantations of the southern United States. Includes slave life, pro-slavery thought, slave management, representations of slavery then and now, abolitionism, and debates about slavery.

HSTAA 230 Race and Power in America, 1861-1940 (5) I&S

Explores race and the shaping of American society between the Civil War and World War II. Topics include reconstruction, segregation and lynching, immigration and naturalization, imperialism, and movements for social justice.

HSTAA 235 The American People and Their Culture in the Modern Era: A History of the United States Since 1940 (5) I&S

Through study of documents, personal testimony, and other source materials, through written reports on historical problems, and through discussions, lectures, films, and audiovisual presentations, students are encouraged to examine evidence and to think "historically" about persons, events, and movements within the memory of their own generation and that immediately preceding theirs. Primarily for first-year students.

HSTAA 270 The Jazz Age (5) I&S

Interdisciplinary study of period after World War I to Great Crash. Afro-American and Anglo-American currents and impulses that flowed together in the Roaring Twenties. Covers politics of normalcy, economics of margin, literature of indulgence and confusion, transformation of race relations, and cultural influence of jazz. Offered: jointly with AFRAM 270.

HSTAA 273 Women of the American West (5) I&S

Women of the Trans-Mississippi West, from the time of European contact to World War II, studied in all their multifarious roles. Explores ethnicity, class, work, family, suffrage, politics, reform, women's groups, arts and entertainment, religion, civilizing and resistance, and gender ideology.

HSTAA 282 Social History of Mexico (5) I&S

Overview of Mexican history from late Aztec times until the twenty-first century. Emphasizes how women, campesinos, indigenous popula-

tions, free and enslaved Afro-Mexicans, and the urban poor experienced the past, challenged colonial and post-colonial rule, and shaped modern Mexican society and culture.

HSTAA 283 History of the Chicano People to 1848 (5) I&S

Historical survey of the Chicano people from pre-Hispanic times to the war between the United States and Mexico. Offered: jointly with CHSTU 180.

HSTAA 284 History of the Chicano People Since 1848 (5) I&S

Historical survey of the Chicano people since the war between the United States and Mexico.

HSTAA 285 Latin American History Through Film (5) I&S/VLPA

Critical analysis of Latin American films as historical documents. Subjects include Iberian conquest and colonialism, the struggle for independence in the nineteenth century, social revolutions of the twentieth century, and problems of contemporary development. Readings and lectures place each film in the context of the historiography of the subject matter.

HSTAA 290 Topics in American History (5, max. 10) I&S

Examines special topics in American history.

HSTAA 301 Foundations of American Civilization (5) I&S

Early America from the sixteenth century to the end of the American Revolution: the founding years, social and religious development, race relations, development of the Atlantic world, origins and legacy of American independence.

HSTAA 302 American Civilization: The First Century of Independence (5) I&S

Establishment of the constitutional system; national expansion; intellectual and cultural development; internal conflicts, the Civil War, and Reconstruction.

HSTAA 303 Modern American Civilization From 1877 (5) I&S

Emergence of modern America, after the Civil War; interrelationships of economic, social, political, and intellectual developments.

HSTAA 313 African Americans in the American West (5) I&S

Explores pre-1848 Spanish-speaking black settlers, slavery, post-civil war migration, buffalo soldiers. 19th and 20th century black urban settlers, World War II migration, the civil rights movement in the West, the interaction of African Americans with other people of color. Particular focus on Seattle and the Pacific Northwest.

HSTAA 315 Researching Indians' History (5) I&S

Finding and interpreting sources of information about American Indians' history. Offered: jointly with AIS 370.

HSTAA 316 History of American Science (5) I&S

History of science in the United States, including migration of European science, development in colonial America, growth of an American scientific community, and expansion of American science in the twentieth century. Issues of scientific attitudes to the natural world, race, ethnicity, and gender are included.

HSTAA 321 Becoming Black Americans (5) I&S

History of Africans in America from slave trade through the Civil War, with emphasis on how gender informed African-American experience. Topics include slave trade, middle

passage, life in plantation south, culture, family structure and resistance, and the experience of free blacks, North and South.

HSTAA 322 African-American History, 1865 To The Present (5) I&S

African-American experience from Reconstruction to the present, emphasizing the variety of African-American political expression. Gender and class differences closely examined, as well as such constructs as "community," "race," and "blackness."

HSTAA 331 American Indian History I: European Discovery to 1840 (5) I&S

Harmon History of Indigenous peoples and their descendants in the area that now constitutes the United States, from the eve of European discovery of the Americas to 1840. Emphasis on relations between Indigenous peoples and immigrants. Offered jointly with AIS 331.

HSTAA 332 American Indian History II: 1840 to Present (5) I&S

Harmon History of American Indians in the United States from 1840 to the present. Emphasis on relations between Indians and non-Indians, government policies, and Indian strategies of survival. Offered jointly with AIS 332.

HSTAA 334 The Sixties in America: Conflict, Confrontation, and Concession (5) I&S

Politico-cultural movements that collided in the sixties. Includes politics of confrontation and civil disobedience, economics of "guns and butter," literature of conflict and angst, polarization of arts, transformation of race relations, role of Rock, and influence of domestic politics on foreign relations. Recommended: AFRAM 150; AFRAM 270. Offered: jointly with AFRAM 334.

HSTAA 335 American Jewish Community 1654-1885 (5) I&S

HSTAA 336 American Jewish History Since 1885 (5) I&S

Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with SISJE 336.

HSTAA 338 The United States and Vietnam (5) I&S

American involvement in Vietnam, including: the complex of negotiations; strategies and objectives of both sides; military, political, and economic operations of the United States; efforts at pacification; impact of Vietnam on American affairs.

HSTAA 353 Class and Labor in American History (5) I&S

The history of workers and class formation from early industrialization to the present. Emphasizes the interaction of class with race, ethnicity, gender, and political culture within the context of American economic development. Explores the role of unions, labor politics, and radical movements.

HSTAA 365 The History of the American Film (5) I&S/VLPA

Explores relationship between film and American social and cultural history. Considers films as products of specific periods, individual filmmakers, and developments within film industry. Examines representations of political and social issues on the screen, impact of movies on our understanding of the past, and significance of genres and visual styles.

HSTAA 370 Consumer Culture in Twentieth Century America (5) I&S Studies the American attempt in this century to create, sustain, and organize the world's first consumer-oriented industrial society. Topics to be considered include: the economy of mass consumption, how a culture of consumption was created, and the ideas of social critics who have rejected consumerism.

HSTAA 371 Consumption and Consumerism in the Modern U.S. (5) I&S *Nash* Surveys the rise of consumer society in the late-nineteenth- and twentieth-century United States including theories of consumption, the experience of consumer culture by different social groups, the role of the state in fostering consumption, the material impacts of consumer society in the U.S. and beyond, and critiques of consumerism. Offered: Sp.

HSTAA 373 Social History of American Women to 1890 (5) I&S *Yee* A multi-racial, multicultural study of women in the United States from the 17th century to 1890 emphasizing women's unpaid work, participation in the paid labor force, charitable and reform activities, and 19th century social movements. Uses primary materials such as diaries, letters, speeches, and artifacts. Offered: jointly with WOMEN 383; W.

HSTAA 374 Social History of American Women in the 20th Century (5) I&S Analyzes major themes in the history of women in North America from 1890 through the 1990s. Themes include family and community formation, social activism, education, paid and unpaid labor patterns, war, migration, and changing conceptions of womanhood and femininity in the 20th century. Offered: jointly with WOMEN 384.

HSTAA 377 History of Canada (5) I&S General survey and analysis of political, economic, social, and cultural aspects of Canadian history from the foundation of New France to present; Canadian-American relations, the rise of Quebec nationalism, and the development of the Canadian West. Offered: jointly with SISCA 377.

HSTAA 384 Latin America: Inter-American and Intra-Continental Relations (5) I&S Inter-American relations, focusing on the United States' diplomatic and military responses to the problems of Latin America since 1776. Intra-Latin American relations and regional organizations (e.g., the Organization of American States).

HSTAA 385 Colonial Society and the Negotiation of Rule in Latin America and the Caribbean (5) I&S Examines the transition to Spanish and Portuguese rule in Latin America and the establishment, and eventual demise, of colonial systems linking Latin America to Europe and Africa. Asks how "colonized" groups mediated forms of colonial oppression and contributed to the development of colonial political culture.

HSTAA 386 The Challenges of Post-Coloniality in Latin America and the Caribbean (5) I&S Explores the legacies of, and ruptures from, colonialism and the new challenges Latin American and Caribbean peoples faced throughout the years after their struggles for independence from direct European rule. Emphasis on analysis of the negotiations and challenges entailed in the dynamic processes of national state formation in comparative perspective.

HSTAA 401 American Revolution and Confederation (5) I&S Causes of separation of

the United States from the British empire; political theory of the Revolution; its military history; diplomacy of the Revolution; the Revolution as a social movement; intellectual aspects; readjustment after independence; the formation of the American union; the Constitution.

HSTAA 404 New England: From the Foundings to the Civil War (5) I&S New England from colonial beginnings to the region's emergence to national leadership in the mid-nineteenth century. Emphasis on Puritanism, the New England town, adjustment to empire, revolution and constitution making, the growth of party, abolitionism, the flowering of a regional culture, and the personalities who embodied these key themes and periods.

HSTAA 406 Asian American Activism (5) I&S Explores the multiple political traditions forged by Asian Americans, from the earliest challenges to racist laws and unequal wages to the latest debates over affirmative action and racial profiling. Examines Asian American communities organized to oppose and to perpetuate social inequalities. Offered: jointly with AAS 406.

HSTAA 407 Andrew Jackson's United States (5) I&S In-depth examination of the U.S. from 1820 to 1850, including changes which affected American politics, society, and culture.

HSTAA 409 American Social History: The Early Years (5) I&S Survey of American society and institutions from the colonial era through the Civil War, with special attention to reform, labor, immigration, education, law enforcement and the city.

HSTAA 410 American Social History: The Modern Era (5) I&S Survey of American society and institutions from Reconstruction to the present with special attention to reform, poverty, social mobility, immigrant and ethnic groups, the city and law enforcement.

HSTAA 411 The United States During the Era of Civil War and Reconstruction (5) I&S Conflicting interests, ideologies, and ways of life in the United States from the 1840s to the 1870s.

HSTAA 412 The Westward Movement, 1700-1850 (5) I&S Anglo-American advance into interior of continental United States culminating in occupation of Far West. Rivalry with New France and New Spain in colonial period; role of federal government in westward expansion; land policy and land distribution; migration, settlement, and the pioneering experience; federal Indian policies and implementation; political evolution, urbanization, and economic development of trans-Appalachian West; shaping of national character and institutions.

HSTAA 413 History of the Trans-Mississippi West (5) I&S Anglo-American exploration, conquest, occupation, and exploitation of the trans-Mississippi West, with emphasis on economic development into the twentieth century. Considers wide range of developmental themes (social, political, cultural) in historiography of American West.

HSTAA 414 The Canadian West, 1670-1990 (5) I&S Examines the history of colonization and settlement of Canada's four westernmost provinces with emphasis on their economic, social, and Native history.

HSTAA 415 History of Indian-White Relations in Anglo-America (5) I&S Explores the wide

variety of interactions in North America, ranging from close alliances to outright warfare, between Native Americans and Europeans and their descendants from contact through the removal of most of the remaining eastern Indians to land west of the Mississippi River during the 1830s.

HSTAA 417 Indians in Western Washington History (3) I&S *Harmon* Relations of Indians and non-Indians in the Puget Sound region, 1790s to the present, with emphasis on evolving ideas about Indian identity. Offered: jointly with AIS 425

HSTAA 431 American Politics and Society Since 1920 (5) I&S Political, social, economic, and intellectual developments in the United States from 1920 to the present.

HSTAA 432 History of Washington and the Pacific Northwest (5) I&S Exploration and settlement; economic development; growth of government and social institutions; statehood.

HSTAA 446 American Indian Economic History (5) I&S *Harmon* Surveys and analyzes the history of American Indians' economic challenges and strategies. Topics include the economic cultures of Indigenous North American societies, the impacts of European colonization and U.S. government policies, and tribal strategies aimed at improving Indians' economic circumstances. Offered: jointly with AIS 446.

HSTAA 454 The Intellectual History of the United States (5) I&S/VLPA Lectures and discussions devoted to the development of the American mind, from historical beginnings to the present.

HSTAA 461 Diplomatic History of the United States, 1776-1901 (5) I&S Foreign policy of the United States government prior to the twentieth century. Emphasis on international wars, territorial expansion, and the peculiarities of the American position in world politics.

HSTAA 462 Diplomatic History of the United States, 1901-Present (5) I&S Foreign policy of the United States government during the twentieth century. International wars and the other major episodes in diplomacy are emphasized.

HSTAA 473 Homefront: American Cultures and Society in the 1940s (5) I&S An exploration of the impact of WWII on American culture and social thought. Topics include the effects of war on civil liberties and civil rights, the uses of nationalism, patriotism, and racial ideology, the internment of Japanese-Americans, responses to the Holocaust, and the effects of war on social life.

HSTAA 480 Labor and Popular Movements in Latin America (5) I&S Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-English-language Latin American studies courses. Offered: jointly with SISLA 480.

HSTAA 481 History of Peru and the Andean Region (5) I&S Traces the history of Peru specifically and the Andean highlands generally, from Inca times to the present, examining the shifting relationship between peasants,

indigenous peoples, and the state. Analyzes historically why modern forms of peasant and indigenous political power differs radically between Peru, Bolivia, and Ecuador.

HSTAA 482 The History of Brazil: Colonial Period to the Present (5) I&S Colonial foundations; the first and second empires; the old and new republics; current problems; prospects for the future.

HSTAA 487 History of Mexico: 1822 to the Present (5) I&S Political, social, and economic history of Mexico from its independence from Spain to the present.

HSTAA 488 History of the Caribbean and Central America (5) I&S Political, social, and economic history of principal countries in the Caribbean and Central America from their discovery to the present.

HSTAA 490 Topics in American History (5, max. 10) I&S Examines special topics in American history.

HSTAA 501 American History: Early (3-6, max. 6) .

HSTAA 503 Seminar in American History, Early (3-) Research seminar in early American History, 1600-1875.

HSTAA 504 Seminar in American History, Early (3-6, max. 12) Research seminar in early American History, 1600-1875.

HSTAA 506 Slavery in the Americas (5) Explores the rise of American slavery beginning with the development of the Atlantic slave trade between southern European powers and coastal African traders. Topics include cultures of slavery in the Americas, comparative racial formations, cultural change, and the role of gender in slave societies.

HSTAA 512 American History: Western (3-6, max. 6) .

HSTAA 513 Seminar in American History: Western ([3-6, max. 12]-) .

HSTAA 514 Seminar in American History: Western (-[3-6, max. 12]) .

HSTAA 516 Hispanics of the United States (3-6, max. 6) .

HSTAA 517 Field Course in American Indian History (5) Field-reading course. Survey of major problems and literature concerning indigenous peoples of North America and their descendants.

HSTAA 519 Asian American History (5) Introduces students to the field of Asian American history, with an emphasis on historiographical shifts and debates. Includes a broad range of topics and methodologies that often cross disciplinary boundaries.

HSTAA 521 American History: Writings and Interpretations, 1770-1870 (4-6) .

HSTAA 522 American History: Writings and Interpretations Since 1870 (4-6) .

HSTAA 524 American Social History Before 1860 (3-6, max. 6) Field course. Survey of major problems and literature in American social history before 1860.

HSTAA 525 American Social History After 1860 (3-6, max. 6) Field course. Survey of major problems and literature in American social history after 1860.

HSTAA 531 American History: Twentieth Century (3-6, max. 6) .

HSTAA 532 Seminar in American History: Recent Period ([3-6, max. 12]-) .

HSTAA 533 Seminar in American History: Recent Period (-[3-6, max. 12]-) .

HSTAA 534 Seminar in American History: Recent Period (-[3-6, max. 12]) .

HSTAA 540 African American Urban History: 1700-2000 (5) Examines the growth and evolution of African-American urban communities from the colonial era to the present, with particular emphasis on cities of the West.

HSTAA 549 Culture, Politics, and Power in Nineteenth-Century Black America (5) Camp Canonical issues, problems, and topics in nineteenth-century black social history. Traces major developments during the period; engages historiographical debates; and explores methodological questions such as the intersection of social and cultural history, and the challenges and possibilities of writing the history of a people with few written records.

HSTAA 550 African-American History to Reconstruction (5) Comprehensive introduction to the major topics and writings in African-American history from the colonial era to 1900, including the inception of slavery, free Blacks, slave revolts, Black abolition, Blacks in the Civil War and Reconstruction, and the Black female role in the struggle for freedom.

HSTAA 551 African-American History Since Reconstruction (5) Comprehensive introduction to the major topics and writings in African-American history in the twentieth century, including Jim Crow era, Black Women's Movement, Harlem Renaissance, legal origins of Civil Rights Revolution, Second Reconstruction, and Politics of Cultural Pluralism.

HSTAA 552 Graduate Seminar in African-American History (5-) Research experiences and opportunities in African-American history. Provides students with skills and methodology to pursue advanced research in the field.

HSTAA 553 Graduate Seminar in African-American History (-5) Research experiences and opportunities in African-American history. Provides students with skills and methodology to pursue advanced research in the field.

HSTAA 554 American History: Intellectual (3-6, max. 6) .

HSTAA 555 Seminar: American Intellectual History ([3-6, max. 6]-) Develops research and writing competence in American intellectual history. Prerequisite: permission of instructor or graduate program coordinator.

HSTAA 556 Seminar: American Intellectual History (-[3-6, max. 6]) Develops research and writing competence in American intellectual history. Prerequisite: permission of instructor or graduate program coordinator.

HSTAA 561 History of American Foreign Policy (3-6, max. 6) .

HSTAA 562 Seminar in American Diplomatic History ([3-6, max. 6]-) .

HSTAA 563 Seminar in American Diplomatic History (-[3-6, max. 6]) .

HSTAA 570 American Environmental History (5) Readings in environmental history emphasizing theory, methodology, and principal themes in the field. Readings emphasize the environmental history of North America and the United States.

HSTAA 581 Latin American History: Colonial Period (3-6, max. 6) .

HSTAA 582 Latin American History: National Period (3-6, max. 6) .

HSTAA 583 Seminar in Latin American History ([3-6, max. 12]-) Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 584 Seminar in Latin American History (-[3-6, max. 12]-) Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 585 Seminar in Latin American History (-[3-6, max. 12]) Problems of historical research in the history of Latin America from colonial beginnings to the present.

HSTAA 590 Topics in American History (5, max. 15) Seminar on selected topics in American history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

Modern European History

HSTEU 205 European Witch Trials (5) I&S Witchcraft and magical beliefs in Europe considered as a problem in intellectual, social, and legal history. Medieval background, systematization of witchcraft theory in fifteenth century; comparison of learned and popular beliefs; mechanisms of witch trials and inquisitorial procedure; the Faust legend; growth of skepticism and decline of witchcraft in seventeenth century.

HSTEU 211 France: A Portrait (5) I&S Thematic approach to the history of France. Abandons the conventional chronological format in favor of a constellation of topics and themes — architecture, science, sex, cities, barricades, etc. — that, taken together and in historical perspective, make up a portrait of France.

HSTEU 220 Introduction to East European Studies (5) I&S Introduction to the history of post-1945 Eastern Europe focusing on political, economic, social, cultural, and diplomatic issues. Countries surveyed include Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia. Offered: jointly with EUO 220.

HSTEU 250 Rome (5) I&S/VLPA Focuses on Rome as an historical, intellectual, and artistic world center. Literary and historic documents, visual arts, architecture, film, and opera used to explore the changing paradigms of the Eternal City. In English. Offered: jointly with ART H 250/ITAL 250.

HSTEU 273 Women and Gender in Modern Europe (5) I&S Examines European women's changing social role and competing views of femininity from the Enlightenment to the end of the cold war. Special focus on the relationship of

gender and politics and on the female body in bourgeois society, industrialization, imperialism, the welfare state, fascism, and the cold war.

HSTEU 274 Twentieth Century Europe (5) I&S Introduction to themes in 20th-century European history (1890s-1900s), including the histories of fascism, world war, communism, decolonization, and the fate of Europe under the European Union.

HSTEU 275 Life in England (5) I&S Social history of England from the Norman conquest to the present, seen through letters, autobiographies, novels, and plays of the time. Life of the ordinary inhabitant-in the village and the manor house.

HSTEU 290 Topics in European History (5, max. 10) I&S Examines special topics in European history.

HSTEU 301 Early Modern European History: 1450-1648 (5) I&S Political, social, economic, and cultural history from the late Renaissance to the Peace of Westphalia.

HSTEU 302 Modern European History: 1648-1815 (5) I&S Political, social, economic, and cultural history from the Peace of Westphalia to the fall of Napoleon.

HSTEU 303 Contemporary European History Since 1815 (5) I&S Political, social, economic, and cultural history from the fall of Napoleon to the present.

HSTEU 304 Cultural History of Renaissance Europe (5) I&S/VLPA Examination of Medicean Florence, late sixteenth-century France, Elizabethan England, and the baroque courts of the early seventeenth century as cultural centers. Includes analysis of painters such as Botticelli and Rubens; poets such as Ronsard and Donne; philosophers such as Pico and Montaigne; and playwrights such as Marlowe, Shakespeare and Lope de Vega.

HSTEU 323 France Since 1814 (5) I&S Political, economic, and social history since the Congress of Vienna. Special emphasis upon the continuity of the revolutionary tradition.

HSTEU 334 Germany 1871-1989 (5) I&S Society and politics from Germany's first unification to its reunification; domestic and foreign policy; political, economic, social, and cultural developments; high emphasis on German society's self-perception and on the variety of interpretations of this period's history. Offered: by different "schools" of historians.

HSTEU 361 Spain and Its Golden Age, 1469-1700 (5) I&S History and culture of Spain and its empire from the late Middle Ages through the seventeenth century.

HSTEU 364 Modern Greece: 1821 to the Present (5) I&S Politics and society of Greece from War of Independence to the present. Emergence and development of the Greek state; Greece in the world wars; civil war and post-war politics; military dictatorship; transition to democracy; recent developments. No prior study of Greece assumed. Offered: jointly with EURO 364.

HSTEU 368 Modern European Jewish History (5) I&S *Stein* Surveys European Jewish history from the Spanish expulsion (1492) to World War I (1914). Considers diversity of European Jewries

and the factors that cohered them. Examines how European Jewries ordered their lives, shaped gender and class norms, and interacted with the societies in which they lived. Offered: jointly with SISJE 368.

HSTEU 370 J.R.R. Tolkien: A Mythology for England (5) VLPA/I&S *Stacey* Explores J.R.R. Tolkien in historical context. Influence of the nineteenth-century philosophy and folklore, World War I, Germanic mythology, Oxford Christianity, and the Inklings. Primary themes include language as a source of myth, fate and free will, religion, technology and nature, heroism and war, race and evil. Offered: Sp.

HSTEU 376 Modern Irish History (5) I&S Political and social history from 1800 to the present; the Irish Question after the Act of Union; development of Irish nationalism in the Home Rule and Sinn Fein periods; the Irish Free State and Northern Ireland since 1921; current problems in Northern Ireland.

HSTEU 378 The Making of Contemporary France (5) I&S Historical origins and subsequent development of nine contemporary problems and characteristics of French government and politics, economy, and society.

HSTEU 380 History of Scandinavia to 1720 (5) I&S Scandinavian history from the Viking Age to 1720, with an emphasis on the political, social, and economic development of Denmark, Norway, Sweden, Finland, and Iceland from the Middle Ages to the Enlightenment. Offered: jointly with SCAND 380.

HSTEU 381 History of Scandinavia Since 1720 (5) I&S Scandinavian history from the Enlightenment to the Welfare State with emphasis on the political, social, and economic development of the modern Scandinavian nations of Denmark, Norway, Sweden, Finland, and Iceland. Offered: jointly with SCAND 381.

HSTEU 401 The Italian Renaissance: (5) I&S Conditions of Renaissance culture: Italian republics and despots, humanism, the classical ideal of the arts, Machiavelli and the foundations of modern political thought; the end of an era.

HSTEU 402 The Reformation (5) I&S Origins of the disunity of Europe in the crisis of the sixteenth century with emphasis on the relations between religion and politics.

HSTEU 405 European Intellectual History: Eighteenth Century (5) I&S/VLPA Development of the social sciences, moral theory, political theory, and religious thought in eighteenth-century Europe. Rationalism, empiricism, utilitarianism, and the sources of idealism.

HSTEU 406 European Intellectual History: Nineteenth Century (5) I&S/VLPA Selected topics in intellectual history up to 1890. The philosophical consequences of the French Revolution, the development of idealism, conservatism, romanticism, and early socialist theory; positivism, the problems of historicism, new forms of Christian apologetics, utilitarianism in decline, liberalism as philosophy, the early Marx.

HSTEU 407 European Intellectual History: Twentieth Century (5) I&S/VLPA Selected topics in the intellectual history of the late nineteenth and early twentieth centuries. The aftermath of Darwinism, the problems of methodology in modern social science,

historicism and moral relativism, irrationalism in philosophy and social theory, revisionism in secular and orthodox religions.

HSTEU 411 Europe: 1814-70 (5) I&S Development of Europe during the age of Metternich, the revolutions of 1848, and the emergence of new national states.

HSTEU 412 Europe in the Age of the Masses: 1870-1914 (5) I&S Impact of population increase and technological change on European society; stresses and strains in European life and outlook.

HSTEU 413 Europe: 1914-45 (5) I&S Politics and society of Europe in the age of the concentration camp.

HSTEU 414 Europe Since 1945 (5) I&S Political, economic, and military developments in Europe under the impact of the Cold War.

HSTEU 415 Europe in the Second World War (5) I&S Inquiry to discover what the war of 1939-45 was about and what it did to more than five hundred million Europeans.

HSTEU 422 The French Revolution and Napoleon: 1789-1815 (5) I&S Transformation of France under the Revolution of 1789; the Reign of Terror and Napoleon; the impact of the revolution and Napoleon upon Europe.

HSTEU 432 Germany: 1914-1945 (5) I&S Politics and society from the collapse of the Bismarckian empire to the collapse of Hitler's empire.

HSTEU 435 World War I (5) I&S European society on the eve of the war. War experience of the Europeans. Long term consequences of the war on European social, political, and economic institutions. Impact of the war on non-European world. The war in European literature.

HSTEU 440 History of Communism (5) I&S Communism from its origins in the Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with SIS 440.

HSTEU 444 Imperial Russia: 1700-1900 (5) I&S Development of Russia from Peter the Great to Nicholas II. Offered: jointly with SISRE 444.

HSTEU 445 Twentieth-Century Russia (5) I&S Russia and the USSR from Nicholas II to the present. Offered: jointly with SISRE 448.

HSTEU 451 East-Central Europe Since 1342 (5) I&S Explores the history of the lands and peoples of East Central Europe (Poles, Czechs, Slovaks, and Hungarians).

HSTEU 452 Eastern Europe Since 1918 (5) I&S Poland, Czechoslovakia, Hungary, Romania, Yugoslavia, Bulgaria, and Albania, from the end of World War I to the present.

HSTEU 453 History of the Balkans, 1400 to the Present (5) I&S Centuries of Ottoman rule that produced a new basis for the reemergence of independent states in the nineteenth and twentieth centuries; history of these new states until the present.

HSTEU 454 Baltic History (5) I&S Overview of the history of the area occupied by the Baltic

countries of Latvia, Lithuania, and Estonia. Emphasizes their emergence as modern European nation-states. Era from World War I to present treated in depth, including the historical role and present situation of non-Baltic peoples, particularly Russians. Offered: jointly with SCAND 454.

HSTEU 464 The Jews in Spanish History (5) I&S Sephardic Jews in Spanish politics, economy, and culture, emphasizing the medieval Golden Age and the Inquisition. Offered: jointly with SISJE 464.

HSTEU 465 The Jews of Eastern Europe (5) I&S Jewish society in Poland, Russia, the Hapsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with SISJE 465.

HSTEU 466 The Sephardic Diaspora: 1492-Present (5) I&S *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with SISJE 466.

HSTEU 470 The Jacobethan Age: England 1580-1630 (5) I&S Emphasis on arts and society instead of the traditional kings, battles, and politics; the way people at all levels of society lived, in towns and in the countryside, within the bounds of the royal court or outside in the political wilderness. Classes on poetry, drama, music, architecture, painting, interior decoration, and some of the minor arts, as well as on demography and some of the traditional historical subjects. Not open for credit to students who have taken 471 or 472.

HSTEU 471 England in the Sixteenth Century (5) I&S Political, administrative, and social history from Henry VII to Elizabeth I, with emphasis on the Reformation and its effects and on conditions of life in Elizabethan England. Not open to students who have taken 470.

HSTEU 472 England in the Seventeenth Century (5) I&S Political, administrative, and social history from the accession of James I to the Glorious Revolution. Not open to students who have taken 470.

HSTEU 474 England in the Nineteenth Century (5) I&S Political, social, and cultural development; the agrarian, industrial, and French revolutions; the rise of parliamentary democracy; the Victorian age; political thought from utilitarianism to Fabianism; Irish home rule.

HSTEU 475 England in the Twentieth Century (5) I&S From the Boer War to the present; conservatism, liberalism, and socialism; England in two world wars; the decline of British imperialism.

HSTEU 482 Fascism in Europe (5) I&S History of the fascist era in modern Europe from 1919 to 1945. A study of the principal examples of national fascism and fascist-like movements coupled with a general theoretical consideration of the phenomenon.

HSTEU 484 Colonial Encounters (5) I&S *Bailkin* History of European colonialism from the 1750s to the present, with an emphasis on British and French colonial encounters. Offered jointly with CHID 484.

HSTEU 490 Topics in European History (5, max. 10) I&S Examines special topics in European history.

HSTEU 501 Renaissance Field Course (3-6, max. 6) Topics in the cultural, political, and social history of the Renaissance era.

HSTEU 502 Reformation Field Course (3-6, max. 6) Topics in the religious, political, and social history of the Reformation era.

HSTEU 505 Early Modern European History (3-6, max. 18) Select topics in early modern European history. Topics vary from quarter to quarter. Prerequisite: permission of instructor.

HSTEU 510 Core Seminar in the History of Modern Europe (5-) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU 511 Core Seminar in the History of Modern Europe (5-) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU 512 Core Seminar in the History of Modern Europe (5-) An introduction to historiographical classics and exemplary new works in the various fields of modern European history. Members of the seminar choose research topics and present the results of their research to the seminar.

HSTEU 515 Modern European Intellectual History (3-6, max. 6) .

HSTEU 516 Seminar: European Intellectual History ([3-6, max. 6]-) .

HSTEU 517 Seminar: European Intellectual History (-[3-6, max. 6]) .

HSTEU 521 Modern European History: France (3-6, max. 6) .

HSTEU 531 Modern European History: Germany (3-6, max. 6) .

HSTEU 532 Seminar in Modern European History: Germany ([3-6, max. 6]-) .

HSTEU 533 Seminar in Modern European History: Germany (-[3-6, max. 6]-) .

HSTEU 534 Seminar in Modern European History: Germany (-[3-6, max. 6]) .

HSTEU 544 Modern Russian History (3-6, max. 6) .

HSTEU 545 Seminar in Modern Russian History ([3-6, max. 6]-) Prerequisite: reading knowledge of Russian and either French or German.

HSTEU 546 Seminar in Modern Russian History (-[3-6, max. 6]-) Prerequisite: reading knowledge of Russian and either French or German.

HSTEU 547 Seminar in Modern Russian History (-[3-6, max. 6]) Prerequisite: reading

knowledge of Russian and either French or German.

HSTEU 548 Field Course in Soviet History (3-6, max. 6) Specialized course for graduate history students in the scholarly literature of Russian history since 1917. Intended for graduate students preparing for MA or Ph.D. field examination in Russian history of the Soviet period.

HSTEU 551 History of Eastern Europe: 1772-1939 (5) Study of the east-central European region: Poland, Czechoslovakia, Hungary, Romania, and the Balkan countries, from their rebirth to World War II. Prerequisite: reading knowledge of German, French, Russian, or one East European language.

HSTEU 552 History of Eastern Europe: 1939 to the Present (5) Prerequisite: reading knowledge of one major European or one East European language.

HSTEU 553 Seminar in Modern East European History ([3-6, max. 6]-) Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 554 Seminar in Modern East European History (-[3-6, max. 6]-) Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 555 Seminar in Modern East European History (-[3-6, max. 6]) Study and research involving special methods dealing with the histories of the East European countries in the modern period.

HSTEU 571 English History: Tudor and Stuart (3-6, max. 6) .

HSTEU 572 English History (3-6, max. 6) .

HSTEU 573 Seminar in Modern English History ([3-6, max. 6]-) .

HSTEU 574 Seminar in Modern English History (-[3-6, max. 6]) .

HSTEU 575 Seminar in Tudor-Stuart History ([3-6, max. 6]-) History of England under the Tudors and the Stuarts. Prerequisite: HSTEU 571 or permission of instructor.

HSTEU 576 Seminar in Tudor-Stuart History (-[3-6, max. 6]) History of England under the Tudors and the Stuarts. Prerequisite: HSTEU 571 or permission of instructor.

HSTEU 590 Topics in History (5, max. 15) Seminar on selected topics in general history, with special emphasis on preparation for field examinations. Topics vary according to interests of students and instructor.

History and Philosophy of Science

HPS 210 Issues in the History and Philosophy of Science (5) I&S Examination of selected topics in the history and philosophy of science at the introductory level. Taught by UW faculty and visiting scholars.

HPS 400 Colloquium in the History and Philosophy of Science (5) I&S/NW Examines

issues from the perspectives of both history and philosophy. Prerequisite: either HIST 311, HIST 312, HIST 313, HIST 314, HIST 315, HIST 317, HIST 318, or HIST 412; either PHIL 350, PHIL 360, PHIL 450, PHIL 460, PHIL 464, PHIL 466, PHIL 473, PHIL 481, PHIL 482, or PHIL 483.

Honors — Arts and Sciences

H A&S 220 Science for Honors Students I (5, max. 10) Evolution of an idea or concept central to the natural sciences. Intended for non-science majors. Content varies from year to year. For university honors students only. Offered: A.

H A&S 221 Science for Honors Students II (5, max. 10) Evolution of an idea or concept central to the natural sciences. Intended for non-science majors. Content varies from year to year. For university honors students only. Offered: W.

H A&S 222 Science for Honors Students III (5, max. 10) Evolution of an idea or concept central to the natural sciences. Intended for non-science majors. Content varies from year to year. For university honors students only. Offered: Sp.

H A&S 251 Western Civilization I (5, max. 10) I&S/VLPA Introduction to ideas and society in Western Civilization. For university honors students only. Offered: A.

H A&S 252 Western Civilization II (5, max. 10) I&S/VLPA Introduction to ideas and society in Western Civilization. For university honors students only. Offered: W.

H A&S 253 Western Civilization III (5, max. 10) I&S/VLPA Introduction to ideas and society in Western Civilization. For university honors students only. Offered: Sp.

H A&S 261 World Civilization I (5, max. 10) I&S/VLPA Introduction to ideas and society of civilization other than the Western. Specific civilization (Chinese, Japanese, Middle Eastern, South Asian) differs from year to year and section to section. For university honors students only. Offered: A.

H A&S 262 World Civilization II (5, max. 10) I&S/VLPA Introduction to ideas and society of civilization other than the Western. Specific civilization (Chinese, Japanese, Middle Eastern, South Asian) differs from year to year and section to section. For university honors students only. Offered: W.

H A&S 263 World Civilization III (5, max. 10) I&S/VLPA Introduction to ideas and society of civilization other than the Western. Specific civilization (Chinese, Japanese, Middle Eastern, South Asian) differs from year to year and section to section. For university honors students only. Offered: Sp.

H A&S 300 Introduction to the Professions (2-5, max. 15) Studies oriented toward professional work (law, medicine, public affairs). For university honors students only.

H A&S 350 Honors Seminar (2, max. 20) Discussion of selected topics in a variety of subject-matter fields. Topics and reading material vary from year to year. For university honors students only. Credit/no credit only.

H A&S 396 Interdisciplinary Special Topics—Natural Science (1-5, max. 10) NW Special

courses drawn from interdisciplinary groups in the natural sciences. Content varies.

H A&S 397 Interdisciplinary Special Topics—Social Science (1-5, max. 10) I&S Special courses drawn from interdisciplinary groups in the social sciences. Content varies.

H A&S 398 Interdisciplinary Special Topics—Humanities (1-5, max. 10) VLPA Special courses drawn from interdisciplinary groups in the humanities. Content varies.

H A&S 499 Honors Independent Study or Research (1-5, max. 10) Faculty supervised Honors independent study or research for students in areas extending beyond their major departments or along lines not otherwise accommodated by existing Honors courses. Honors students only.

International Studies

European Studies

EURO 111 Elementary Modern Greek (5) Fundamentals of oral and written modern Greek. Offered: A.

EURO 112 Elementary Modern Greek (5) Fundamentals of oral and written modern Greek. Recommended: EURO 111 or GREEK 401. Offered: W.

EURO 113 Elementary Modern Greek (5) Fundamentals of oral and written modern Greek. Recommended: EURO 112 or GREEK 402. Offered: Sp.

EURO 140 Russia From the Tenth Century to the Present (5) I&S Russian political, social, and economic history from the tenth century to the present. Offered: jointly with HIST 140.

EURO 211 Second-Year Modern Greek (5) VLPA Continuation of EURO 111, 112, 113. Intensive practice in speaking, reading, and writing. Recommended: EURO 113 or GREEK 403. Offered: A.

EURO 212 Second-Year Modern Greek (5) VLPA Continuation of EURO 111, 112, 113. Intensive practice in speaking, reading, and writing. Recommended: EURO 211. Offered: W.

EURO 213 Second-Year Modern Greek (5) VLPA Continuation of EURO 111, 112, 113. Intensive practice in speaking, reading, and writing. Recommended: EURO 212. Offered: Sp.

EURO 220 Introduction to East European Studies (5) I&S Felak Introduction to the history of post-1945 Eastern Europe focusing on political, economic, social, cultural, and diplomatic issues. Countries surveyed include Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia. Offered: jointly with HSTEU 220.

EURO 243 Russian Civilization (5) I&S Russia's civilization, including fine arts, literature, religion, and history; political, social, and legal institutions and thought in relation to the general development of Russian society from early times to 1917.

EURO 301 Europe Today (5) I&S Ingebritsen A multi-disciplinary approach to contemporary Europe focusing on social, political, cultural, and economic change, with special reference to

developments in the countries of the European Union, Scandinavia, and those in Eastern Europe in the post-Soviet era.

EURO 320 Greek History: 7000 BC to Present (5) I&S Thomas History of Greece from its Neolithic village origins to the present. Examines the different forms of one of the most resilient cultures in the human story. Offered: jointly with HIST 320, A.

EURO 324 Soviet and Post-Soviet Society (5) I&S Social, cultural, political, and economic systems of the major nations which, until 1991, comprised the Soviet Union and are now independent states. Deals with period of full communist power and changes brought about by its demise.

EURO 344 The Baltic States and Scandinavia (5) I&S Survey of the cultures and history of Estonia, Latvia, and Lithuania from the Viking Age to the present, with particular attention to Baltic-Scandinavian contacts. Offered: jointly with SCAND 344.

EURO 345 Baltic Cultures (5) I&S/VLPA Cultures and peoples of Estonia, Latvia, and Lithuania. Baltic literature, music, art, and film in social and historical context. Traditional contacts with Scandinavia and Central and East Europe. Offered: jointly with SCAND 345.

EURO 360 Contemporary Spain (5) I&S/VLPA Social, political, and cultural developments in Spain since the end of the Franco dictatorship in 1975. Extensive use of Spanish Web sites. Prerequisite: SPAN 302 which may be taken concurrently. Offered: jointly with SPAN 360.

EURO 364 Modern Greece: 1821 to the Present (5) I&S Politics and society of Greece from War of Independence to the present. Emergence and development of the Greek state; Greece in the world wars; civil war and post-war politics; military dictatorship; transition to democracy; recent developments. No prior study of Greece assumed. Offered: jointly with HSTEU 364.

EURO 395 Supervised Internship (1-5, max. 5).

EURO 399 Study Abroad (1-5, max. 15) I&S For participants in Study Abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

EURO 420 The Olympics: The Merging of Old and New in Modern Greece (5) I&S Explores the role of the Olympic games in the history and culture of Greece, from Bronze Age pre-Olympiads to the 2004 Athens Games. Topics include mythical and historical origins of the Olympics, moral principles and practices in Greek sports, and modern Olympics, 1896 to 2004. Offered: jointly with HIST 420.

EURO 425 European Media Systems (5) I&S Examines media systems in selected countries in Europe and policy issues that link (or divide) members of the European Union and other major media producers. Media studied in context of the contemporary economic, social, political, and cultural milieu in which they operate. Offered: jointly with COM 425.

EURO 445 War and Occupation in Northern Europe: History, Fiction, and Memoir (5) The study of literary representations (fiction, memoirs, and personal narratives) dealing with World War

II and the occupation of the Nordic and Baltic countries. Offered: jointly with SCAND 445.

EURO 481 August Strindberg and European Cultural History (5) I&S/VLPA Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with SCAND 481.

EURO 490 Special Topics (1-5, max. 15) I&S .

EURO 494 Senior Seminar I (5) I&S Introduction to research into European topics and to the analysis of problems.

EURO 495 Senior Seminar II (5) I&S Writing and discussion of senior thesis. Prerequisite: EURO 494. Offered: Sp.

EURO 496 Paris: Architecture and Urbanism (3-5, max. 5) I&S/VLPA Spans the architectural history of Paris, from its Gallic, pre-roman origins in the 2nd century BCE through the work of 21st century architects. Focuses on changing patterns of the physical fabric of the city and its buildings, as seen within the context of the broader political, social, economic, and cultural history. Offered: jointly with ART H 494.

EURO 499 Undergraduate Research (1-5, max. 15) .

African Studies

SISAF 399 Study Abroad: African Studies (1-5, max. 15) I&S For participants in study abroad program. Specific content varies. Courses do not automatically apply to major/minor requirements.

SISAF 444 African Studies Seminar (5, max. 15) I&S Interdisciplinary seminar focusing upon one particular aspect of the African continent. Emphasis may be humanistic, social scientific, or historical. African Studies faculty and visiting scholars lecture on areas of their own expertise.

SISAF 490 Special Topics (1-5, max. 15) I&S .

SISAF 499 Undergraduate Research (1-5, max. 15) .

Asian Studies

SISA 209 Asian Civilizations: Traditions (5) VLPA *Porter* Interdisciplinary introduction to the civilizations of Asia, particularly those of India, China, Japan, and Korea. Explores the religion, philosophy, literature, art, and social and political thought of these civilizations from ancient times to the 17th century.

SISA 210 Rise of Asia (5) I&S *Anchordoguy, Bachman, Giebel, Sorensen* Key themes in the study of Asia, with focus on the present. Topics include: the notion of "Asia;" cultural and religious similarities and differences; comparison of colonial experiences under Western and Asian powers; World War II and liberation; postwar patterns of economic and political development; social patterns and issues. Offered: A.

SISA 244 Imperialism and Anti-Colonialism in Asia (5) I&S Introduction to Western imperialism expansion, conquest, and colonial rule in Asia; the anti-colonial, nationalist resistances they engendered; and the resultant cultural, political, economic, and intellectual transformations in Asian societies. Covers post-1800 violence, racial hierarchies, human rights abuses, post-

colonial memories, persistent strategies of domination, and structural inequities. Offered: jointly with HSTAS 244.

SISA 245 Human Rights in Asia (5) I&S *Callahan, Giebel* Introduction to recent and ongoing human rights issues in South, Southeast, and East Asia. Focuses on how human rights politics have played out in domestic political arenas. Provides exposure to views/insights into the historical context in which human rights claims, abuses, and debates arise. Offered: jointly with HSTAS 245.

SISA 265 Globalization and the Transformation Economy and Society in Asia (5) I&S *Hamilton* Examines the rapid and extensive social and economic development throughout Asia since the mid-20th century; the corresponding retail revolution in the American economy; the evolution of characteristic Asian product categories; and the impact of these developments on the social and economic organization of Asian economies. Offered: jointly with SOC 265.

SISA 372 Asian Sustainable Development (5) I&S *Jhaveri* Examines the contemporary relationship between environmental protection and development paths in Asia. Inquires into the forces driving both environmental change and societal responses (state and local regulations, social movements, etc.) to that change, at many geographical scales. Asian concepts of nature-society relations also explored. Offered: jointly with GEOG 372.

SISA 399 Study Abroad: Asian Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISA 401 Asia and the World (5) I&S *Bachman* Overview of major issues and developments in the interactions of Northeast and Southeast Asia and the world. Topics include economic development and integration, sources of instability, and historical patterns of relations. Particular focus on major current issues related to the region. Prerequisite: SIS 201, SISA 210.

SISA 490 Special Topics (1-5, max. 15) I&S Content varies.

SISA 499 Undergraduate Research (1-5, max. 15) .

SISA 590 Special Topics (1-5, max. 10) I&S Special topics in Asian Studies. Course content varies by instructor.

Canadian Studies

SISCA 308 Canada: A Geographic Interpretation (5) I&S *Jackson* Examines the overlapping economic, cultural, and political geographies shaping life in contemporary Canada. Topics include: free trade, constitutional crisis, feminism in Canada, aboriginal politics, and border region phenomena. Attention paid to how specific geographic interpretations of Canada by Canadians actually play a part in national life. Offered: jointly with GEOG 308.

SISCA 341 Government and Politics of Canada (5) I&S Critical analysis of parliamentary institutions, political parties, and the federal system in Canada. Offered: jointly with POL S

341.

SISCA 356 Canadian Society (5) I&S Origins to the present in its North American setting; political development, cultural evolution, and emergence of multinationalism; economic base; arts and literature; problems of the environment; Canadian foreign relations.

SISCA 377 History of Canada (5) I&S *Jackson* General survey and analysis of political, economic, social, and cultural aspects of Canadian history from the foundation of New France to present; Canadian-American relations, the rise of Quebec nationalism, and the development of the Canadian West. Offered: jointly with HSTAA 377.

SISCA 399 Study Abroad: Canadian Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISCA 400 Canadian Values and Symbols (5) I&S Overview of the ideas, events, and activities which help define Canadians as a people. Examines the "national" expression of these values and symbols, as evidenced in historical experience, a physical environment often harsh and unyielding, a diverse people and cultures, and a pride in achievement that is frequently slow to surface.

SISCA 424 Canadian Media Systems (5) I&S Structure and operation of Canadian mass media and telecommunications industries. Impact of United States media on Canadian culture. Role of domestic media in lives of minorities. Laws and policies governing communications. Offered: jointly with CMU 424.

SISCA 430 Canadian Documentary Film Traditions (5) I&S/VLPA History and development of non-fiction film documentary traditions, especially in Canada, the first institutionally defined area in which documentaries became prominent through the National Film Board and the Canadian Broadcasting Corporation. Discussion of Flaherty, Greirson, and independent network producers who developed present-day style of documentaries. Offered: jointly with COM 430.

SISCA 441 Quebecois Literature (5) VLPA *Delcourt* Readings of novels, plays, and occasionally, poetry. Special attention paid to how Quebecois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with FRENCH 441.

SISCA 450 Comparative Health Care Practices: Canada and the United States (1, max. 3) I&S Provides a platform for critical, analytic thought on health care practices. Topics vary by quarter: politics, ethics, and environmental influences on health care (Autumn); dependent populations, elderly, children, and developmentally delayed (Winter); aboriginal health care, problems and solutions (Spring).

SISCA 490 Special Topics (1-5, max. 15) Content varies.

SISCA 495 Multiculturalism in Canada (5) I&S History of the multi-racial and multi-ethnic character of Canadian society. Impact of federal policy of bilingualism and multiculturalism.

Current issues of language rights, retention of cultural heritage, self-government for aboriginal peoples, and improving race and ethnic relations.

SISCA 498 Seminar: Canadian Problems (5) I&S Major issues pertaining to Canadian society, government, and economic development.

SISCA 499 Undergraduate Research (1-5, max. 15) .

SISCA 507 Research Seminar: Canadian Problems (5, max. 10) Consideration of the spatial dimensions of Canadian socioeconomic, cultural, and political development, with emphasis on resource potentials and relations with the United States, Japan, and other important trading partners. Prerequisite: GEOG 308 or permission of instructor. Offered: jointly with GEOG 507.

SISCA 590 Special Topics (2-5, max. 10) Offered occasionally by visitors or resident faculty. Course content varies.

SISCA 600 Independent Study (*) .

Comparative Religion

RELIG 201 Introduction to World Religions: Western Traditions (5) I&S History of religions, concentrating on religious traditions that have developed west of the Indus. Primary attention to the Semitic religions (Judaism, Christianity, Islam) and to their ancient world background with emphasis on basic conceptual and symbolic structures.

RELIG 202 Introduction to World Religions: Eastern Traditions (5) I&S History of religions, concentrating on religions that have developed in South Asia and East Asia. Primary attention to Hinduism and Buddhism; other important Asian religions are discussed in relation to them, with emphasis on basic conceptual and symbolic structures.

RELIG 205 Religion, Violence, and Peace: Patterns Across Time and Tradition (5) I&S *Noegel, Wellman* Investigates the complex relationship between violence and peace in a variety of religious traditions. Examines case studies from the ancient Near East, medieval East Asia, and the contemporary West from the standpoint of lived experiences and contemporary theories derived from several academic disciplines. Offered: jointly with HUM/NEAR E 205; W.

RELIG 210 Introduction to Judaism (5) I&S *Jaffee* Basic ideas and motifs of Judaism: God, Covenant, Law, Life Cycle (birth, marriage, family life, sexual laws, role of women, death); Cycle of the Year (Sabbath, holidays, festivals); Holy Land, prayer, Messianism.

RELIG 211 Islam (5) I&S/VLPA *Wheeler* Introduction to important cultural and historical aspects of Islam, focusing on basic concepts and developments such as prophethood, Quran and Hadith, canon and law, ritual, social theory, Sufism, theology, and sectarianism. Special attention to comparison of varied Muslim practices and beliefs, and their relation to textual and personal authority. Offered: jointly with NEAR E 211.

RELIG 212 Introduction to the Quran (5) I&S/VLPA *Wheeler* Emphasis on the historical context of the Quran, the history of the text, its collection, organization, and interpretation. In

English. Offered: jointly with NEAR E 212.

RELIG 220 Introduction to the New Testament (5) I&S/VLPA *Williams* Modern scholarly methods of research and analysis in dealing with New Testament books and their interpretation. Genres of various books (gospel, epistle, sacred history, apocalypse); problems of the relationships among author, material, and intended audience; relationships between theme and image.

RELIG 240 Introduction to the Hebrew Bible: Old Testament (5) I&S/VLPA *Noegel* Examines the Hebrew Bible (Old Testament) in translation and its relationship with literatures of ancient Near East. Comparisons drawn between the biblical text and the literary works of Canaan, Egypt, Greece, and Mesopotamia. Emphasis on the sophisticated literary techniques employed by the biblical writers. Offered: jointly with NEAR E 240.

RELIG 254 American Religions (5) I&S *Wellman* Seeks to understand religious diversity in the American context and the varieties of religions in the American historical horizon including religious minorities, American Protestants, public religious expressions, and new American religions.

RELIG 264 Sacred Music in the European Tradition (5) VLPA *Surveys* European and American sacred music from the 12th to 20th centuries, examining the important role of music in religious worship. Considers the means composers used to make musical works sound the way they do to convey the messages of the texts through music. Offered: jointly with MUSIC 264.

RELIG 301 Religious Thought Since the Middle Ages (5) I&S Development of religious thought in the West from the Middle Ages to the twentieth century. History of focal ideas: God, man, knowledge, and authority during this period and the relation of changes in these ideas to the ways in which basic issues in religious thought have been conceived. Recommended: RELIG 201.

RELIG 320 Comparative Study of Death (5) I&S Death analyzed from a cross-cultural perspective. Topics include funerary practices, concepts of the soul and afterlife, cultural variations in grief, cemeteries as folk art, and medical and ethical issues in comparative context. American death practices compared to those of other cultures. Offered: jointly with ANTH 322.

RELIG 321 Comparative Religion (3) I&S Anthropological approaches to religious experience and belief with emphasis on conceptual issues such as ritual, symbolism, identify, ecstatic experience, and revitalization movements in the context of globalization. Also addresses the diversity of religious expression in American culture and how that compares with other societies. Offered: jointly with ANTH 321.

RELIG 322 The Gospels and Jesus of Nazareth (5) I&S *Williams* Gospel material from early Christianity, including both canonical and noncanonical gospels. Relation of gospels to analogous literature from the Hellenistic-Roman period. Recommended: ENGL 310 or RELIG 220.

RELIG 324 The Emergence of Christianity (5) I&S *Williams* Studies stages in the development

of Christianity as a new religion, during the first to fifth centuries CE, as the classical forms and institutions of Christian "orthodoxy" gradually achieved definition, and as this emerging Christian tradition became a dominant cultural and socio-political force. Recommended: HIST 307, RELIG 201, or RELIG 220.

RELIG 327 Eastern Christian Traditions (5) I&S Eastern Christian traditions, with principal focus on Eastern Orthodox tradition in Byzantium and Russia from time of the Council of Nicea to the twentieth century. Considers significant differences between eastern and western Christianity and their doctrinal and cultural origins; explores distinctive features of eastern tradition. Recommended: HIST 307 or RELIG 201.

RELIG 330 Religion, Identity, and Cultural Pluralism (5) I&S The role of religion in shaping personal and communal identity in a pluralistic society. Themes include current dimensions of American pluralism, effects of ethnicity, immigration, and electronic communication on building religious communities, and issues of conflict, violence, and reconciliation. Offered: jointly with ANTH 330.

RELIG 350 Buddhism and Society: The Theravada Buddhist Tradition in South and Southeast Asia (5) I&S *Keyes* Religious tradition of Theravada Buddhism (as practiced in Sri Lanka, Burma, Thailand, Laos, and Cambodia). Variations in ethical orientations developed through Theravada Buddhist ideas. Recommended: RELIG 202 or one eastern religions course. Offered: jointly with ANTH 352.

RELIG 352 Hinduism (5) I&S *Pauwels* Varieties of Hindu religious practice; the diverse patterns of religious thought and action among contemporary Hindus. Includes ritual behavior, village Hinduism, tantrism, sadhus, yoga, sects, the major gods and their mythologies, religious art, and the adjustments of Hinduism to modernity. Recommended: RELIG 202 or one South Asian culture course.

RELIG 354 Buddhism (5) I&S *Cox* Buddhism as a religious way and as a way of thinking; the forms of Buddhism known in South Asia (India, Sri Lanka) and those introduced from there to Tibet and other parts of Central Asia. Includes the "Three Jewels" (i.e., the Buddha or Awakened Person, the Teaching [Dharma], and Community [Sangha]) around which Buddhism is traditionally articulated. Recommended: RELIG 202 or one Asian cultures course.

RELIG 380 The Nature of Religion and Its Study (5) I&S *Jaffee* Study of religion as a general human phenomenon. Manner in which different methods of inquiry (phenomenology, anthropology, sociology, psychology, literary criticism, archaeology, philosophy, theology) illuminate different aspects of religion and help to shape our conceptions of its nature. Recommended: RELIG 201 or RELIG 202. Offered: jointly with CHID 380.

RELIG 399 Study Abroad — Comparative Religion (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

RELIG 400 The Jewish Mystical Tradition (5) I&S *Jaffee* Jewish esoteric thought from antiquity to early modern times. Emergence of Spanish Kabbalah. The thought of Isaac Luria and its

immense influence in Jewish history through other movements—specifically the mystical messiah, Sabbetai Sevi, and the rise of Hasidism. Recommended: RELIG 201 or RELIG 210.

RELIG 405 Scripture in Judaism (5) I&S *Jaffee* Explores the phenomenon of religious interpretation of sacred books by attending to the destiny of the Bible as read within Judaism. Begins with the canonization of the biblical text itself and continues into the rationalist and mystical interpretive innovations of the Middle Ages. Recommended: HIST/SISJE 250, RELIG 201, or RELIG 210.

RELIG 410 Law in Judaic Experience (5) I&S *Jaffee* Place and function of law in Jewish social and personal experience. Discusses the various ideological justifications of the law in biblical and rabbinic literature, examines representative texts, and explores theological reflection on law by medieval and modern thinkers. Recommended: RELIG 201; RELIG 210; RELIG 400 or RELIG 405.

RELIG 415 Modern Jewish Thought (5) I&S *Jaffee* Major trends in Jewish religious thought since the European Enlightenment, focusing on encounters between Judaism and the modern world. Includes Haskalah; varieties of religious reform and accommodation; Zionism; socialism; the philosophy of Rosenzweig, Buber, and Kaplan; and theological responses to the Holocaust. Recommended: HIST/SISJE 250, HSTEU/SISJE 469, RELIG 201, or RELIG 210.

RELIG 420 The World of the Early Church (5) I&S *Williams* Early Christian church within the context of the Greco-Roman sociopolitical, philosophical, and religious environment. Covers the period from about AD 100 to 300. Christian thinkers and documents studied include both the classical “orthodox” and the “heretical.” Recommended: HIST 307, RELIG 220, or RELIG 324.

RELIG 421 The Age of St. Augustine (5) I&S Christian church in the fourth and fifth centuries as a major institution in the Roman Empire. Great figures of patristic theology, such as Athanasius, Gregory Nazianzus, Gregory of Nyssa, and Augustine. Recommended: HIST 307, RELIG 320, or RELIG 324.

RELIG 426 Gnosticism and Early Christianity (5) I&S *Williams* Impact of Gnosticism on the development of Christianity and several other religious groups of that period. Readings dating from the first through the third centuries AD.

RELIG 428 Modern Christian Theology (5) I&S Modern Protestant and Catholic thought since the nineteenth century: Kierkegaard, Barth, Bultmann, Rahner, Lonergan, and other major figures. Recommended: RELIG 301.

RELIG 430 Scripture and Law in Islam (5) I&S/VLPA *B. Wheeler* Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with NEAR E 430.

RELIG 432 Ritual and Territory in Islam (5) I&S/VLPA *B. Wheeler* Comparative study of Islamic ritual practices and related development of jurisprudence and law. Focus on sacrifice, political and social legal theory, pilgrimage, regulation of the body, and the diversity of contemporary practices. In English. Offered: jointly with NEAR E 432.

RELIG 433 Life of Prophet Muhammad (5) I&S/VLPA *Wheeler* Examines historical and religious traditions associated with the life of the Prophet Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with NEAR E 433.

RELIG 442 Art, Religion, and Politics in the Early Christian Period, 300-700 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of the early Christian period (300-700 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with ART H 452.

RELIG 443 Art, Religion, and Politics in Byzantium, 700-1453 AD (3) I&S/VLPA *Kartsonis* Evolution of the art of Byzantium (700-1453 AD) in the context of contemporary religious, political, and cultural developments. Recommended: some background in Byzantine art or history. Offered: jointly with ART H 453.

RELIG 445 Greek and Roman Religion (3) I&S/VLPA *Harmon* Religion in social life of Greeks and Romans; emphasis on their public rituals and festivals. Priesthoods, personal piety, rituals of purification and healing, and the conflict of religions in the early Roman Empire. Recommended: RELIG 201. Offered: jointly with CLAS 445.

RELIG 452 Topics in the Buddhism of Tibet (3) I&S Topics in the development of Buddhism of Tibet. Includes the relationship between reasoning and religious thought; the concept of a person; the formation of the different schools of Tibetan Buddhism; the notion of lineage; the master-disciple relationship in the tantric tradition. Recommended: ANTH 352, RELIG 202, RELIG 350, or RELIG 354.

RELIG 454 Perceptions of the Feminine Divine in Hinduism (5) VLPA *Pauwels* Explores implications of the perception of a feminine divine for gender issues in South Asia. Includes historical overview of goddess worship in South Asia, mythologies, philosophical systems, cults, and rituals associated with the major goddesses, the phenomena of *suttee*, goddess possession, and women's goddess rituals at the village level.

RELIG 456 Women in Ancient Judaism (3) I&S/VLPA *Noegel* Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with NEAR E 456.

RELIG 457 The History of Biblical Interpretation (3) I&S/VLPA *Noegel* Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a “hands-on” approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with NEAR E 457.

RELIG 460 Anti-Semitism As a Cultural System (5) I&S *Jaffee* Comparative study of various anti-Semitic cultural systems from ancient to modern times. Topics include how anti-Semitism can be defined as a cultural phenom-

enon; the conditions that explain the circulation of anti-Semitic traditions in a given society; the conditions under which social conflict with Jews becomes anti-Semitism.

RELIG 490 Special Topics (1-5, max. 15) I&S Topics vary with each offering.

RELIG 491 Seminar: Topics and Issues in Judaism (5) I&S *Jaffee* Topics vary. Recommended: RELIG 210; RELIG 400, RELIG 405, or RELIG 410.

RELIG 492 Seminar: Topics in Early Christianity (5) I&S *Williams* Topics vary. Recommended: one early Christian history or literature course.

RELIG 497 Field Archaeology (1-10, max. 20) Professionally-guided archaeological fieldwork at a recognized archeological dig in the United States or abroad. Offered: S.

RELIG 498 Honors Thesis (5) I&S Required course for Comparative Religion honors students.

RELIG 499 Undergraduate Research (1-5, max. 15) Primarily for comparative religion majors and majors in the School of International Studies.

RELIG 501 Approaches to the Study of Religion (5) Major approaches employed by modern scholarship in the study of religion, including historical, phenomenological, anthropological, sociological, and psychological. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

RELIG 502 Religion in Comparative Perspective (5, max. 15) Analysis of selected theme or symbols in relation to several different religious traditions. Topics vary. Prerequisite: admission to the comparative religion MAIS program or permission of instructor.

RELIG 504 Religion and Culture (5) Study of the relations between religion and culture, with attention to the role of religion in defining conceptions of order and grounding sociopolitical and artistic traditions.

RELIG 510 Colloquium in Comparative Religion (1, max. 6) Required colloquium for graduate students in comparative religion program. Introduction to faculty research and to major methods and disciplines in the study of religion. Credit/no credit only.

RELIG 520 Seminar On Early Christianity (5) *Williams* Problems in the history and literature of early Christianity.

RELIG 528 Christian Theology (5) Study of exemplary figures in the history of Christian religious thought. Prerequisite: RELIG 428.

RELIG 570 Religion and Literature (5) The relation of religious thought to the study of imaginative literature. Includes both critical theory and practical criticism of exemplary texts.

RELIG 580 Seminar in Hinduism Studies (5) *Pauwels* Introduction to the academic study of Hinduism for graduate students. Examines major problems currently addressed in the academic study of Hinduism and the methods used. Provides a historical perspective on past scholarship. Offered: jointly with ASIAN 580.

RELIG 590 Special Topics (2-5, max. 10)

Offered occasionally by visitors or resident faculty. Course content varies.

RELIG 600 Independent Study or Research (*)**East Asian Studies****SISEA 212 History of Korean Civilization (5)**

I&S From earliest times to present. Development of Korean society and culture in terms of government organization, social and economic change, literature, art. Offered: jointly with HSTAS 212.

SISEA 213 The Korean Peninsula and World Politics (5)

I&S Introduction to Korean politics, economics, society, and international relations since the late nineteenth century. Addresses the evolution of Korean in international society by comparing Korea's experience with that of China and Japan. Offered: jointly with POL S 213.

SISEA 236 Geography of Greater China (5)

I&S *Chan* Studies the geography of development processes, patterns, and problems in "Greater China": mainland China, Taiwan, and Hong Kong. Covers physical geography, history, and economic and political systems, with major focus on geographical issues in China's development: agriculture, population, industry and trade, and relations with Hong Kong and Taiwan. Offered: jointly with GEOG 236.

SISEA 241 Japanese Civilization (5) I&S

Japan's civilization, including its origins, government, literature, economic institutions, material culture, social organization, and religions, in relation to the development of Japan as a society and nation. Cannot be taken for credit if SISEA 341 previously taken. Offered: jointly with HSTAS 241.

SISEA 242 Japan in the Contemporary World (5) I&S

Interdisciplinary introduction to various aspects of contemporary Japan, such as its politics, economics, and society. Focuses on how Japan has interacted with the global community in the period since World War II.

SISEA 370 Han Chinese Society and Culture (5) I&S

Anagnost, Harrell Themes in the society and culture of the Han Chinese people. Concepts of self; personal interaction; family, gender, and marriage; communities and the state; religion and ritual; class, social categories, and social mobility; culturalism, nationalism, and patriotism. Offered: jointly with ANTH 370.

SISEA 399 Study Abroad: East Asian Studies (1-5, max. 15) I&S

For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISEA 406 China's Environment (5) I&S/NW

Analysis of contemporary environmental problems in China, including population, food, water supply, pollution, biodiversity, and environmental activism. Combines natural science and social science perspectives. Prerequisite: either ANTH 210, ENVIR 201, SIS 200, SIS 201, or SIS 202. Offered: jointly with ANTH 406.

SISEA 423 History of Modern Japan (5) I&S

Pyle Political, social, economic, and cultural development of Japan from the late Tokugawa period to the present with special emphasis on the cultural impact of the West. Offered: jointly

with HSTAS 423.

SISEA 424 Perspectives on East Asia for Teachers (3, max. 6) I&S

Substantive concepts, resources, and materials employed in teaching about East Asia. Requirements may vary in relation to the background of participants.

SISEA 434 Demographic Issues in Asia (3-5)

I&S *Hirschman, Lavelly* Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. Addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SOC 434.

SISEA 435 Japanese Government and Politics (5) I&S

Hellmann Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with POL S 435.

SISEA 436 Political Parties in Japan and East Asia (5) I&S

Focus on political parties in Japan. Combines theoretical readings on political parties with intensive study of Japanese political parties. Recommended: either SISEA 242, SISEA 423, SISEA 440, or SISEA 442. Offered: jointly with POL S 429.

SISEA 439 Politics of Divided Korea (5) I&S

Governments, politics, and economy of South and North Korea, the inter-Korea relations, and the two Koreas' relationship with the major powers — especially the United States — with emphasis on the post-cold war period. Offered: jointly with POL S 439.

SISEA 440 The Emergence of Postwar Japan (5) I&S

Pyle The making of modern Japan; World War II and surrender; American occupation; postoccupation rebuilding; emergence as an industrial power. Recommended: HSTAS 423 or SISEA 423. Offered: jointly with HSTAS 424.

SISEA 441 Economic and Social History of Japan to 1900 (5) I&S

Lecture-seminar on Japanese economic and social history from 700 to 1900. Analyses of the rise and decline of the shoen system, the rise of commerce, social change, changes in the living standard, demographic changes, and the early phases of industrialization. Political and cultural developments as related to economic and social change. Prerequisite: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341. Offered: jointly with HSTAS 441.

SISEA 442 Political Economy of Postwar Japan (5) I&S

Anchordoguy Political and economic problems of Japan since 1945. Utility of competing theoretical approaches to analysis of government and economy of Japan. Policy-making processes and effects of policies adopted. Some knowledge of postwar Japan desirable. Recommended: SISEA 440/HSTAS 424.

SISEA 443 Class and Culture in East Asia (5) I&S

Examines the nexus between culture and systems of social stratification/class in East Asia, with an emphasis on Taiwan, Korea, Japan, and China. Topics include class formation, mechanisms of social mobility and reproduction, markers of status and hierarchy, resistance, and the formation of class identity. Offered: jointly with ANTH 446.

SISEA 444 Politics of Representation in Modern China (5) I&S

Focuses on issues of

representation and power in twentieth century China. Combines substantive information on modern Chinese society and culture with recent debates in social theory and the politics of representation. Major themes include Chinese nationalism, body politics, popular culture, and everyday practice. Offered: jointly with ANTH 444.

SISEA 445 Religion in China (5) I&S

Harrell Religion in Chinese society, doctrines, practices, and social consequences of the eclectic folk religion, the elite Confucian, Taoist, and Buddhist traditions, syncretistic sects, and imported Christianity. Prerequisite: either one 200-level ANTH course, ANTH 370, ANTH 403, LING 203, HSTAS 211, HSTAS 454, RELIG 202, SISEA 370, or SISEA 443.

SISEA 448 Modern Korean Society (5) I&S

Sorensen Social organization and values of twentieth-century Korea. Changes in family and kinship, gender relations, rural society, urban life, education, and industrial organization since 1900. Differences between North and South Korea since 1945. Recommended: HSTAS/SISEA 212. Offered: jointly with ANTH 448.

SISEA 449 Government and Politics of China (5) I&S

Whiting Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with POL S 442.

SISEA 454 History of Modern China (5) I&S

Dong Social, cultural, political, economic, and intellectual transformations and continuities in China from the end of the imperial period to the present. Offered: jointly with HSTAS 454.

SISEA 456 Topics in Chinese Social History (5) I&S

Ebrey, Guy Surveys major issues and approaches to the study of the role of the Chinese people in China's historical development. Historical focus of course varies with instructor. Recommended: HSTAS 211, HSTAS 452, HSTAS 453, or HSTAS/SISEA 454. Offered: jointly with HSTAS 456.

SISEA 459 United States-China Relations (5) I&S

Bachman Surveys the history of United States-China relations and examines the evolution of bilateral relations, particularly since 1949. Focus on the period since 1972 and the major issues as they have evolved since that time, including trade, human rights, security, and Taiwan. Offered: jointly with POL S 419.

SISEA 460 Cities in China: Past and Present (5) I&S

Economic, political, social, and cultural functions of the city in modern Chinese history. Changes in China's urban system. The city as cultural center and focus of literary and cinematic representation. Attention to architecture, commerce, urbanization, the role of capital cities in the power of the state. Offered: jointly with HSTAS 460.

SISEA 462 China and Globalization (5) I&S

Bachman Examines the dynamics of the rise of China, its growing interactions with the international system and how it is in turn affected by the processes associated with globalization. Specific areas of examination include flows of resources, people, and information, and conceptions of Chinese identity. Prerequisite: SISA 210.

SISEA 468 China's Economic Reforms: Integration Into World Economy (5) I&S

Wong A systematic survey of China's economic reforms

since 1978, including China's increasing integration into world economy. Prerequisite: ECON 201. Offered: jointly with ECON 468.

SISEA 469 Law, Development, and Transition in East Asia (5) I&S Examines the role of law and the courts in economic and political change in the developing world. Topics include variations in legal traditions and institutions, economic development, property rights, dispute resolution, democratization, and human rights. Empirical materials focus on East Asia. Offered: jointly with LSJ 469/POL S 469.

SISEA 470 Minority Peoples of China (5) I&S Harrell Interaction between China and the peoples of its periphery, including Inner Asia, Tibet, Northern Mainland, Southeast Asia, and aboriginal peoples of Taiwan. Emphasis on ethnicity, ethnic group consciousness, and role of the Chinese state. Prerequisite: either ANTH/SISEA 370, HSTAS 454, LING 203, or one 200-level ANTH course. Offered: jointly with ANTH 470.

SISEA 474 Civil Society in Japan and East Asia (5) I&S Pekkanen Examines a wide range of nongovernmental organizations (NGOs) nonprofits, and voluntary groups under the unifying rubric of civil society. Theoretical introduction to civil society and ideas of social capital. Investigates general aspects of civil society, focusing on its specific characteristics in Japan and other parts of Asia.

SISEA 475 Japanese Society (5) I&S Discusses rapidly changing Japanese society and history of its unique aspects. Readings and lectures in sociology, anthropology, economics, and politics; emphasis on Japanese search for cultural identity and prevalent interpretations of Japanese society and behavior. Recommended: either SISEA 241/HSTAS 241 or SISEA 341/HSTAS 341.

SISEA 478 Readings in the Social Sciences in Japanese (3-5) I&S Introduction to articles and short works in economics, history, political science, and other social sciences. Assignments chosen from major Japanese monthlies and academic works. All readings in Japanese. Prerequisite: JAPAN 313.

SISEA 479 Readings in the Social Sciences in Japanese (3-5) I&S Introduction to articles and short works in economics, history, political science, and other social sciences. Assignments chosen from major Japanese monthlies and academic works. All readings in Japanese. Prerequisite: JAPAN 313.

SISEA 480 New Orders in East Asia (5) I&S Pyle Rise and fall of successive international systems in East Asia over the past 150 years: Sino-centric, imperialist, Washington Treaty system, Japan's East Asian order, Yalta system, cold-war system. Post-cold-war search for a new order. Special attention to triangular relations among the United States, China, and Japan.

SISEA 481 Science, Technology, and Innovation Policies in East Asia (5) I&S Anchoroguy Role of state and technological change in economic development. Analyzes state and corporate technology policies historically. Basic technology concepts, institutions, and policies in Japan, South Korea, Taiwan, and China. Examines sources of Asia's rise in world of technology and explores whether conditions for its success will continue. Recommended: SISEA or SISA course. Offered: jointly with I BUS 461.

SISEA 482 Japanese Business and Technology (5) I&S Anchoroguy Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future. Offered: jointly with I BUS 462.

SISEA 490 Special Topics (1-5, max. 15) I&S Course content varies.

SISEA 494 Economy of Japan (5) I&S Analysis of the economic growth of Japan since about 1850 to the present. The reasons for rapid industrialization, various effects of sustained economic growth, and significant contemporary issues are investigated. Prerequisite: ECON 201. Offered: jointly with ECON 494.

SISEA 499 Undergraduate Research (1-5, max. 15) .

SISEA 517 Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4) Introduction to the regulatory regime governing foreign trade and investment in China and in-depth coverage of key aspects of the regime, with focus on issues faced by U.S. businesses. Covers specific regulations, their implementation in practice, as well as the political and economic background. Offered: jointly with LAW E 517.

SISEA 521 Seminar: Introduction to the Interdisciplinary Study of China (5-) Bachman, Dong, Guy .

SISEA 522 Seminar: Introduction to the Interdisciplinary Study of China (-5) Bachman, Dong, Guy .

SISEA 531 Chinese History: Research Methods and Bibliographic Guides (3, max. 6) Guy Introductory research seminar dealing with the methodological and bibliographical problems concerning all periods and aspects of Chinese history from the earliest times to the nineteenth century. Prerequisite: two years of classical or modern Chinese.

SISEA 532 The Chinese Political System (5) Bachman, Whiting Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with POL S 532.

SISEA 533 Seminar on Contemporary Chinese Politics (5) Research on selected problems in contemporary Chinese politics. Prerequisite: SISEA 532 or permission of instructor. Offered: jointly with POL S 533.

SISEA 535 International Relations of Modern China (5) Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with POL S 535.

SISEA 536 Political Parties in Japan and East Asia (5) Focus on political parties in Japan. Combines theoretical readings on political parties with intensive study of Japanese political parties. Recommended: either SISEA 242, SISEA 423, SISEA 440, or SISEA 442.

SISEA 538 Selected Topics on the Chinese Economy (5) Introduction to key issues of China's growth; the transition from planned economy; the changing role of the state; central-local relations; macro-management of the economy; income distribution; resources and agriculture; the external sector and the WTO.

SISEA 540 Japanese Law (4) Taylor Basic institutions and processes of the Japanese legal system. Historical development and traditional role of law, reception of Western law, and cultural and structural factors that influence the function of law and legal institutions. Offered: jointly with LAW B 540.

SISEA 541 Economic and Social History of Japan to 1900 (5) Analyses of landholding systems, the rise of commerce, demographic changes, urbanization, early industrialization, and social change. Prerequisite: previous course work in Japanese history or economic history, or permission of instructor. Not open to students who have taken 441. Offered: jointly with HSTAS 541.

SISEA 542 Political Economy of Post War Japan (5) Anchoroguy Political and economic problems of Japan since 1945. Utility of competing theoretical approaches to analysis of government and economy of Japan. Policy-making processes and effects of policies adopted. Recommended: some knowledge of postwar Japan.

SISEA 543 Law in East Asia: China (4) Introduction to the institutions and processes of the Chinese legal system. Focuses on the contemporary system and its role in relation to political, economic and social developments. Examines legal aspects governing foreign trade and investment in China. Offered: jointly with LAW B 541.

SISEA 549 Government Regulation of Business in Japan (3) Offered: jointly with LAW B 549.

SISEA 550 Japan, the United States, and New Orders in Asia (5) Pyle Seeks historical understanding of establishment of new order in contemporary East Asia. Analyzes the imperialist, Washington conference, and cold war systems and explores the present post-cold war search for a new order. Prerequisite: one course in modern Japanese history, political economy, or political science.

SISEA 551 International Relations of Northeast Asia (5) Hellmann Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with POL S 539.

SISEA 553 Chinese Legal Tradition (3) Concepts and principles of the legal tradition in China. Draws on primary and secondary sources in English and, for students with Chinese language competence, traces the concept and development of Chinese law as well as legal institutions in Chinese society. Offered: jointly with LAW B 553.

SISEA 555 Introduction to Japanese Studies (3-6, max. 6) Anchoroguy Interdisciplinary

introduction to the study of Japan, with emphasis on historical development. Required seminar for first-year graduate students.

SISEA 558 Readings on Japan in the Social Sciences (5) Seminar discussing articles in Japanese in economics, history, political science, and other social sciences. Assignments from major Japanese monthlies and academic works. Prerequisite: JAPAN 313 or equivalent and permission of instructor.

SISEA 559 Interdisciplinary Seminar on Japan (5) Advanced readings in history and the social sciences. Prerequisite: permission of instructor.

SISEA 574 Civil Society in Japan and East Asia (5) *Pekkanen* Examines a wide range of nongovernmental organizations (NGOs), nonprofits, and voluntary groups under the unifying rubric of civil society. Theoretical introduction to civil society and ideas of social capital. Investigates general aspects of civil society, focusing on its specific characteristics in Japan and other parts of Asia. Not open to students who have taken SISEA 474.

SISEA 575 Seminar on Japanese Society (5) Interdisciplinary seminar with class-led discussions on readings from anthropology, history, sociology, and nondiscipline-specific articles on Japanese society. Prerequisite: background on Japan. Not open to students who have taken SISEA 475.

SISEA 577 Readings on Political Economy of Japan and Northeast Asia (5) *Anchordoguy* Analysis of major issues in Japan and also in Korea and China, such as the state's role in industrial development, trade and investment in Asia, trade and security relations with the U.S., and Asian models of capitalism.

SISEA 579 Modern Chinese History (5) Introduction to the major English-language literature on modern Chinese history and to the major historiographical issues of the period. Prerequisite: HSTAS 454 or equivalent, and permission of instructor. Offered: jointly with HSTAS 579.

SISEA 581 Science, Technology, and Innovation Policies in East Asia (5) *Anchordoguy* Role of state and technological change in economic development. Analyzes state and corporate policies historically. Technology concepts, institutions, and policies in Japan, South Korea, Taiwan, and China. Examines sources of Asia's rise in world of technology and explores conditions for its successful continuation. Not open to undergraduates. Recommended: SISEA/SSIA course. Offered: jointly with I BUS 561.

SISEA 582 Japanese Business and Technology (5) *Anchordoguy* Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future. Offered: jointly with I BUS 562.

SISEA 584 Survey of Korean Society (5) *Sorensen* Introduction to the social and political institutions of North and South Korea with an opportunity to master the most important literature on modern Korea. Focuses on the twentieth century with the major emphasis on the post-1945 period. Offered: A.

SISEA 585 Research Seminar: Modern Korea

(6) *Sorensen* Advanced instruction in problems and methods of research in Korean history. Foreign language not required. Prerequisite: permission of instructor.

SISEA 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visiting or resident faculty.

SISEA 600 Independent Study or Research (*).

SISEA 700 Master's Thesis (*) .

International Studies

SIS 103 Society and the Oceans (5) I&S/NW Explores the social and policy dimensions of the ocean environment and ocean management policy. Attention to how human values, institutions, culture, and history shape environmental issues and policy responses. Examines case studies and influential frameworks, such as the ocean as "tragedy of the commons". Offered: jointly with ENVIR/SMA 103.

SIS 123 Introduction to Globalization (5) I&S *Sparke* Provides an introduction to the debates over globalization. Focuses on the growth and intensification of global ties. Addresses the resulting inequalities and tensions, as well as the new opportunities for cultural and political exchange. Topics include the impacts on government, finance, labor, culture, the environment, health, and activism. Offered: jointly with GEOG 123.

SIS 200 States and Capitalism: The Origins of the Modern Global System (5) I&S *Chirof, Kasaba, Migdal* Origins of the modern world system in the sixteenth century and its history until World War I. Interacting forces of politics and economics around the globe, with particular attention to key periods of expansion and crisis.

SIS 201 The Making of the 21st Century (5) I&S Provides a historical understanding of the twentieth century and major global issues today. Focuses on interdisciplinary social science theories, methods, and information relating to global processes and on developing analytical and writing skills to engage complex questions of causation and effects of global events and forces. Recommended: SIS 200. Offered: WSp.

SIS 202 Cultural Interactions in an Interdependent World (5) I&S *Guy, Sorensen, Warren* Cultural interaction among societies and civilizations, particularly Western and non-Western. Intellectual, cultural, social, and artistic aspects; historical factors.

SIS 216 Science and Society (5) I&S/NW *Chaloupka* Investigation of the relationship between science, technology and society. Nuclear physics and molecular biology serves as concrete examples of fields with significant impact on society. Offered jointly with PHYS 216, Sp.

SIS 225 The Silk Road (5) I&S *Waugh* History of cultural and economic exchange across Eurasia from the early Common Era to modern times. Topics include spread of religions such as Islam and Buddhism, overland trade in rare commodities, interaction between nomadic and sedentary cultures, the role of empires, the culture of daily life, and the arts. Offered: jointly with HIST 225.

SIS 301 War (5) I&S Origins and conduct of war; readings from anthropology, political science, economics, and history, as well as novels and some recent works on the arms-control

controversy. Modern forms of warfare, including guerrilla war, world war, and nuclear war. Offered: jointly with SOC 301.

SIS 302 Intercultural Relations (5) I&S Perspectives on foreign cultures through literary example. Interdisciplinary approaches to the study of culture as such and problems of intercultural relations. Prerequisite: either one 200-level ANTH course, LING 203 or SIS 202.

SIS 325 Immigration (5) I&S Introduces key theoretical debates in international migration. Examines immigrants' political, economic, religious, and social integration into host societies, and continued ties to homelands. Experiences of voluntary and involuntary immigrants, of the second generation, and of incorporation into America and Europe. Designed around interdisciplinary texts and fieldwork in Seattle.

SIS 330 Political Economy of Development (5) I&S *Poznanski, Wong* Growth, income distribution, and economic development in less-developed countries today. Policies concerning trade, industrialization, the agricultural sector, human resources, and financing of development. Prerequisite: ECON 201 which may be taken concurrently.

SIS 332 Political Economy of International Trade and Finance (5) I&S *Poznanski* Theoretical and historical analysis to explore the causes and effects of the rise and decline of four major international trade and monetary regimes. Foundations and emerging features of the new international trade and monetary regime and its implications for the world economy.

SIS 333 Gender and Globalization: Theory and Process (5) I&S *Ramamurthy* Theoretical, historical, and empirical analysis of how current processes of globalization are transforming the actual conditions of women's lives, labor, gender ideologies, and politics in complex and contradictory ways. Topics include feminist exploration of colonialism, capitalism, economic restructuring policies, resistance in consumer and environmental movements. Offered: jointly with WOMEN 333.

SIS 335 Geography of the Developing World (5) I&S Characteristics and causes, external and internal, of Third World development and obstacles to that development. Special attention to demographic and agricultural patterns, resource development, industrialization, and urbanization, drawing on specific case studies from Asia, Africa, and Latin America. Offered: jointly with GEOG 335.

SIS 337 Collective Violence and the State (5) I&S Comparative study of collective violence in modern states with emphasis on riots and pogroms. Readings include case materials drawn from Russian pogroms of the nineteenth and twentieth centuries, Hindu-Muslim riots in modern India, and race riots in the United States and Great Britain. Offered: jointly with POL S 337.

SIS 342 Social Theory in International Context (5) I&S Comparative, historical introduction to the foundations of modern social theory in the work of Max Weber, Sigmund Freud, and Claude Levi-Strauss. Focus on tensions between universalist claims, European origins, and non-European applications of models of cultural formation and development.

SIS 344 Migration in the Global Economy (5) I&S *Mitchell* Analyzes the relationship between

human mobility in the late 20th century and changes in the global economy. Allows the student to gain familiarity with scholarly research on international migration from a diversity of approaches and methods. Offered: jointly with GEOG 344; W.

SIS 345 Women and International Economic Development (5) I&S *Ramamurthy* Questions how women are affected by economic development in Third World and celebrates redefinitions of what development means. Theoretical perspectives and methods to interrogate gender and development policies introduced. Current processes of globalization and potential for changing gender and economic inequalities assessed. Offered: jointly with ANTH 345/WOMEN 345.

SIS 348 Alternative Routes to Modernity (5) I&S Routes to modernity followed by non-Western societies between 1600 and 1900. Historical experiences of non-Western societies seen in the context of European history and of development theory. Emphasizes primary sources and techniques for posing theoretical questions of historical data. Offered: jointly with HSTAS 348.

SIS 350 Environmental Norms in International Politics (5) I&S *Ingebriksen* Surveys development of international environmental consciousness from 1960s to present. Models of "green development"; ways in which norms for resource use have entered global politics. Patterns of state compliance with international environmental agreements, and why states fall short of meeting their international obligations. Offered: jointly with ENVIR 360/SCAND 350.

SIS 360 Technology, Growth, and Competition (5) I&S *Poznanski* Discusses theoretical accounts of empirical findings on technological change (invention, innovation, diffusion) and factors behind technological change, e.g., market structure, business cycle, state policies. Analyzes the impact of technology on economic growth, i.e., productivity. Discusses the role of technology in foreign trade, particularly in the United States.

SIS 362 Law and Justice: An Introduction to Social Theory (5) I&S *Godoy* Provides conceptual tools for understanding law and its role in society by acquainting students with major currents of social theory. Topics include liberalism, Marxism, critical feminist theory, and critical race theory. Offered: jointly with LSJ 362.

SIS 365 World Cities (5) I&S *Kasaba, Sparke* Factors that have propelled New York, London, and Tokyo into key positions in the organization of the late twentieth century international system. Asks historical and comparative questions and discusses the reasons behind the diminished position of cities such as Venice, Vienna, and Istanbul in that system.

SIS 375 Geopolitics (5) I&S An introduction to both political geography and geopolitics, addressing the fundamental links between power and space. Topics covered include: theories of power, space, and modernity; the formation of modern states; international geopolitics in the aftermath of the Cold War; the post-colonial nation-state; and the geopolitics of resistance. Offered: jointly with GEOG 375.

SIS 377 Turkic Peoples of Central Asia (3) I&S *Cirtautas* History of the Turkic peoples, AD 552 to present. Emphasis on current status of Turkic peoples in Central Asia. Geographical distribution, demographic data, reactions and adapta-

tions to changes resulting from the 1917 revolution. Turkic viewpoint on past and present developments. Offered: jointly with NEAR E 375.

SIS 390 Political Economy of Industrialized Nations (5) I&S *Ingebriksen* Theoretical bases of various political economic systems of industrialized nations. Several major issues these political economies currently face; usefulness and limits of economic analyses within broader perspective of political economy. Prerequisite: ECON 201 which may be taken concurrently.

SIS 397 Junior Honors Seminar (5) I&S Designed to facilitate writing of honors thesis through methodological and bibliographical research. Required of honors candidates.

SIS 399 Study Abroad — International Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SIS 401 International Political Economy (5) I&S *Ingebriksen, Poznanski* Establishment, maintenance, and decay of the post-1945 international economic order. Political economy of international trade, monetary relations, inflation, and North-South relations. Prerequisite: SIS 201 which may be taken concurrently; ECON 201 which may be taken concurrently.

SIS 405 Political Economy of Religious Institutions (5) I&S Comparative study of Buddhist, Taoist, Christian, and Islamic religious institutions as political and economic phenomena. Impact of wealth and power on religious institutions or religious ideas. Temporal coverage from the formative period to the present. Recommended: one China, Japan, Middle East, or Europe course.

SIS 406 Political Islam and Islamic Fundamentalism (5) I&S Study of resurgence, since mid-1970s, of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with POL S 432.

SIS 410 Introduction to Global Internet Political Economy (5) I&S *Hellmann* Impact of the Internet revolution on structure and operating procedures of the international system. Effects of Internet-driven forces on aspects of the global political economy: cultural and political identities; interactions between states and markets; meaning of the boundaries of sovereignty and civil society.

SIS 419 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with COM 420/POL S 468.

SIS 421 National Security and International Affairs (5) I&S *Jones* Major military aspects of contemporary international politics. Uses and limitations of military capabilities for sustaining a stable international order and national security. Processes by which states detect and assess threats to their security; practice of deterrence; transfer of arms among states; pursuit of arms

control. Recommended: one SIS or international relations course.

SIS 422 The United States in the Contemporary International System (5) I&S United States in the world: ways in which international circumstances shape the political-strategic, economic, and cultural dimensions of America's policy. Case studies from post-1945 period. Recommended: one international relations or foreign policy course.

SIS 423 Practicing American Foreign Policy (5) I&S Develops familiarity with tools available to promote international objectives of the United States. International case studies selected to illustrate the diverse considerations inherent in the policy process and evaluate the strengths and weaknesses of the national institutions involved. Prerequisite: SIS 201.

SIS 425 International Law and Arms Control (5) I&S Surveys the political, legal, and technological history of 20th-century arms control agreements with emphasis on the treaties which ended the Cold War. Examines current issues of law, politics, military strategy, and technology in regard to weapons of mass destruction and related topics in international security. Offered: Sp.

SIS 426 World Politics (5) I&S *Caporaso, Modelski* Nation-state system and its alternatives; world distributions of preferences and power; structures of international authority; historical world societies and their politics. Offered: jointly with POL S 426.

SIS 430 International Population (5) I&S *Lavelly* Demographic situation of the world and of major world regions. The demographic transition. Topics include public health, policies of fertility and mortality control, international migration, relation of population growth to economic development, social change, and resource constraints. Exploration and manipulation of international demographic data.

SIS 432 Population and Modernization (3) I&S *Hirschman, Lavelly* Examines role of demographic factors in process of social modernization and economic growth. Approach is historical, focusing on populations of developed countries since 1700, and analytic, stressing attempts made by different disciplines to model demographic relationships, with attention to less developed regions. Offered: jointly with SOC 432.

SIS 433 Environmental Degradation in the Tropics (5) I&S/NW Considers theories and controversies of environmental degradation in the tropics, ecological and social case studies of Central American rain forests and Southeast Asian coral reefs, and implications of environmental management techniques. Offered: jointly with ENVIR 433/SMA 433.

SIS 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) I&S Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Offered: jointly with POL S 436.

SIS 438 Forced Migrations (5) I&S *Friedman* Provides an interdisciplinary understanding of the causes, characteristics, and consequences of

forced migration experiences across the global system. Explores how international policy makers, humanitarian workers, and scholars have constructed forced migration as a problem for analysis and action, including some of the ethical dilemmas involved. Recommended: SIS 325 or SIS 344.

SIS 440 History of Communism (5) I&S *Ellison* Communism from its origins in Bolshevik faction of Russian social democracy to the present, treating the development of the ideology, the various communist parties, and the communist states. Recommended: two history or politics of Europe courses. Offered: jointly with HSTEU 440.

SIS 444 Peasants in Politics (5) I&S *Young* Interdisciplinary study of peasants, with special attention to questions of rural transformation. Peasant involvement in an increasingly independent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with POL S 446.

SIS 446 History, Memory, and Justice (5) I&S *Giebel* Focuses on the complex interactions between history and historical representation, remembrance and commemoration, memory and identity, and notions of justice and reconciliation. Addresses these issues on methodological, theoretical, and practical grounds, drawing on examples from various genres, periods, and world regions. Offered.

SIS 449 Social Transformation of Modern East Asia (5) I&S *Sorensen* Comparative study of social change in China, Japan, Korea, and Vietnam since 1945. Concentration on small-scale social units in rural and urban areas under both communist and capitalist political systems. Recommended: two history or anthropology of East Asia courses. Offered: jointly with ANTH 449.

SIS 450 Political Economy of Women and Family in the Third World (5) I&S Theoretical and empirical aspects of the political economy of women and the family in the Third World during the process of development, with a focus on labor. Main theoretical approaches examined and applied to case studies from Asia and Latin America. Offered: jointly with SOC 450.

SIS 452 Law and Politics of International Trade (5) I&S *Pekkanen* Survey of global trade politics in the context of the World Trade Organization (WTO), with attention to positive and negative aspects of its governance. Examines the impact of the WTO legal framework on trade relations among developed and developing countries. Covers topics such as dispute settlement, development, safeguards, antidumping, intellectual property, and regionalism.

SIS 455 Industry and the State (5) I&S *Whiting* Builds on states and markets approach of 200 and 201 through specific examination of effects of industry and industrial structure on political outcomes and roles of state. Emphasis on late-developing and newly developing economies. Prerequisite: SIS 200; SIS 201.

SIS 456 State-Society Relations in Third World Countries (5) I&S *Bachman, Kasaba* Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of economic and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with POL S 450.

SIS 460 Law, State, and Society (5) I&S *Migdal* Examination of both state law and non-state law (rules and ways of ordering behavior such as customary law, religious law, and social conventions). Focuses on the ways non-state law interacts with and affects state law and is affected by state law.

SIS 465 Deeply Divided Societies (5) I&S *Migdal* Ethnic conflict seen from two perspectives: 1. the study of theoretical approaches as a means of understanding deeply divided societies; 2. a focus on one or more specific conflicts. Recommended: SIS 201 or POL S 204.

SIS 467 Nations and States in the Modern World (5) I&S Development of national consciousness in the "old nations" of Europe before the French Revolution. Replacement by the new nationalism and its spread into East Central Europe, Russia, Ibero-America, Asia, and Africa. Offered: jointly with HIST 467.

SIS 470 Human Rights in Latin America (5) I&S Human rights in Latin America, focusing on twentieth century dictatorships and current regional events and their implications for human rights. Cannot be taken for credit if GIS 174 or SISLA 120 previously taken. Offered: jointly with LSJ 410. Prerequisite: either ANTH 323, LSJ 320, LSJ 321, POL S 368, PHIL 338, SIS 200, or SIS 201.

SIS 476 Comparative International Political Economy (5) I&S *Ingebritsen, Pozanaski* Comparative analysis of four major approaches to international political economy: mercantilism, Marxism, liberalism, and evolutionary approach. Focus on international cooperation, social change, and economic institutions. Theoretical analysis of the four paradigms and applications to historic and current issues in international political economy: hegemonic cycle, post-communist transition, and cross-national income inequality.

SIS 490 Special Topics (1-5, max. 15) I&S Content varies from quarter to quarter.

SIS 491 Senior Honors Seminar (5-) I&S Study of issues related to students' thesis topics. Develops thesis-writing skills. Open only to Jackson School honors students.

SIS 492 Senior Honors Seminar (-5) I&S Students write a senior thesis working with their individual writing advisers.

SIS 494 Senior Research (2) Independent research and writing under supervision of a faculty member. Open only to International Studies majors.

SIS 495 Task Force (5) I&S Small-group seminars address current problems in international affairs, each focusing on one specific policy question and producing a joint task force report. Restricted to senior majors in International Studies. Prerequisite: SIS 200; SIS 201; SIS 202; SIS 401.

SIS 497 Internship (1-5, max. 15) Credit for the completion of an approved internship in international studies. Credit/no credit only.

SIS 498 Readings in International Studies (5) I&S Reading and discussion of selected works of major importance in interdisciplinary international studies. Restricted to majors in International Studies.

SIS 499 Undergraduate Research (1-5, max. 15) .

SIS 500 Seminar: Origins of the Modern Global System (3) *Kasaba, Migdal* Development of global interdependence from the fifteenth century to World War II. Interrelationship of politics and economics. International political economy from contextual, institutional, and historical perspectives.

SIS 501 Seminar: Comparative International Studies (3) *Kasaba, Poznanski* Focuses on comparison across geographical areas including comparative political economy, comparative cultures, and comparative institutions. Provides familiarity with the comparative method of inquiry, an understanding of the interplay between area studies and cross-regional theories, and skills in conducting comparative research and writing. Prerequisite: ECON 200; ECON 201.

SIS 502 Seminar: Globalization and International Relations (3) *Jones* Focuses on globalization, including international relations and transnational studies. Provides an understanding of the interplay of area studies with processes that transcend geographical areas and intersect political boundaries, an overview of transnationalism or international relations, and skills in undertaking a major research and writing project.

SIS 511 Practicum: Methods in International Studies (3) *Chirot* Assumptions underlying leading methodologies for comparative study of societies and other large-scale social entities. Quantitative and nonquantitative methods illustrated by recent research. Prerequisite: SIS 502.

SIS 512 Task Force in International Affairs (3) *Chirot* Seminar addressing a current problem in international affairs and resulting in a joint task-force report. Results presented to, and critiqued by, a distinguished outside evaluator at end of term. Prerequisite: SIS 511.

SIS 520 Introduction to Theories and Quantitative Methods for Social Science Research (5) Selected social scientific theories and quantitative methods for students in international and area-studies programs. Introduction to methodological neoclassicism, neo-institutional analysis, "developmentalism," rational choice and dynamic institutionalist approaches, and selected theories from political science. Essentials of statistical analysis.

SIS 522 Special Topics in Ethnicity and Nationalism (3, max. 6) Topics vary, but always focus on ethnic group relations and nationalism viewed from a broad, comparative, interdisciplinary perspective. Emphasis is heavily cross-cultural, and the geographical coverage worldwide. .

SIS 524 International Security (5) *Kier, Mercer* Introduces some of the major debates concerning the use of force in international politics. Covers traditional issues in international security such as alliances and the causes of war, as well as some of the new and important questions, such as explaining war outcomes and war termination. Offered jointly with POL S 524.

SIS 534 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and

strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 530/POL S 534.

SIS 542 Seminar: State and Society (5) Migdal Examines the mutually conditioning relationship between states and the societies they seek to govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with POL S 542.

SIS 552 Law and Politics of International Trade (5) I&S Pekkanen Survey of global trade politics in the context of the World Trade Organization (WTO), with attention to positive and negative aspects of its governance. Examines the impact of the WTO legal framework on trade relations among developed and developing countries. Covers topics such as dispute settlement, development, safeguards, antidumping, intellectual property, and regionalism.

SIS 553 Environment and Health in the World Trade Organization (5) Pekkanen Conflicts between global environmental and public health on the one hand and international trade expansion on the other in the World Trade Organization (WTO). Focuses on the state of GATT/WTO jurisprudence and its interaction with sovereign laws and regulations. Cases include asbestos, reformulated gasoline, beef hormones, shrimp-turtle, and genetically modified organisms. Offered:

SIS 562 Law, Globalization, and Multinational Corporations (3) An interdisciplinary workshop that examines the role of multinational corporations in a global society. Topics include the legal construct of the multinational corporation, the multinational and the state, the multinational and human rights, and the multinational in the international arena. Offered: jointly with LAW E 512.

SIS 575 Advanced Political Geography (5) Sparke Provides resources for theorizing how politics shapes and is shaped by geographical relationships. Examines how politics are situated in complex material and discursive geographies that are partly reproduced through political negotiations. Examines interrelationships of contemporary capitalism with other complex systems of social and political power relations. Offered: jointly with GEOG 575.

SIS 580 Teaching International Studies (2, max. 4) Migdal For current and prospective teaching assistants. Includes teaching writing, leading effective discussions, the art of evaluation, and teaching critical reading skills; videotaping of actual teaching sessions of participants in class. Credit/no credit only.

SIS 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visiting or resident faculty.

SIS 600 Independent Study or Research (*) .

Jewish Studies

SISJE 177 The Jewish Community in the United States: Success, Influence, and Prospects (5) I&S Burstein Examines relationship between American society and its ethnic/religious groups through study of the American Jewish community. Focuses on

economic success; challenges to religious traditions; relationships between American and Jewish cultures; and impact of Jewish ideas and organizations on American politics. Offered: jointly with SOC 177; S.

SISJE 250 Introduction to Jewish Cultural History (5) I&S Introductory orientation to the settings in which Jews have marked out for themselves distinctive identities as a people, a culture, and as a religious community. Examines Jewish cultural history as a production of Jewish identity that is always produced in conversation with others in the non-Jewish world. Offered: jointly with HIST 250.

SISJE 269 The Holocaust: History and Memory (5) I&S Explores the Holocaust as crucial event of the twentieth century. Examines the origins of the Holocaust, perpetrators and victims, and efforts to come to terms with this genocide in Europe, Israel, and the United States. Offered: jointly with HIST 269.

SISJE 312 Jewish Literature: Biblical to Modern (5) I&S/VLPA A study of Jewish literature from Biblical narrative and rabbinic commentary to modern prose and poetry with intervening texts primarily organized around major themes: martyrdom and suffering, destruction and exile, messianism, Hasidism and Enlightenment, Yiddishism and Zionism. Various critical approaches; geographic and historic contexts. Offered: jointly with ENGL 312.

SISJE 336 American Jewish History Since 1885 (5) I&S Political, social, economic, religious history of American Jewish community from great eastern European migration to present. Integration of immigrant community into general American community; rise of nativism; development of American socialism; World War I and II; and reactions of American Jews to these events. Offered: jointly with HSTAA 336.

SISJE 367 Medieval Jewish History (5) I&S Stacey Social and intellectual history of the Jews in Western Europe to fifteenth century. Jews under Islam and Christianity; the church and the Jews; the Crusades and their legacy; intellectual achievements; conflict and cooperation. Offered: jointly with HSTEU 367.

SISJE 368 Modern European Jewish History (5) I&S Stein Surveys European Jewish history from the Spanish expulsion (1492) to World War I (1914). Considers diversity of European Jewries and the factors that cohered them. Examines how European Jewries ordered their lives, shaped gender and class norms, and interacted with the societies in which they lived. Offered: jointly with HSTEU 368.

SISJE 369 The Jewish Twentieth Century in Film (5) I&S Stein Surveys twentieth-century Jewish history in its European, American, and Middle Eastern contexts by examining films produced in these settings. Considers central events that shaped modern Jewish culture: the changing geography of Europe and the Middle East, mass migrations, the Holocaust, shifting meanings of race, culture, and religion. Offered: jointly with HIST 369.

SISJE 377 The American Jewish Community (5) I&S Burstein Development and current status of American Jewish community: immigration; changes in religious practice, institutions in response to circumstances in American Society; creation of new types of secular communal organizations; assimilation; confrontation with

antisemitism; family life; social, economic mobility; religious, secular education; intermarriage, and future of community. Offered: jointly with SOC 377.

SISJE 378 Contemporary Jewish American Identities (5) I&S Friedman Introduction to the debates about post-Holocaust Jewish identities in multicultural America. Explores whether a distinctive Jewish community is headed toward assimilation, experiencing revival, or merely transforming the multiple ways Jewish experience is lived. Topics include new Jewish immigrants, the new Orthodox, Black Jews, Jewish feminism, children of Holocaust survivors. Offered: jointly with SOC 378.

SISJE 399 Study Abroad — Jewish Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISJE 438 Jewish Women in Contemporary America (5) I&S Examines how Jewish women's identities are socially constructed and transformed in contemporary America, using social histories, memoirs, and ethnographies to analyze scholars' approaches to Jewish women's lives. Topics include the role of social class, religion, migration, the Holocaust, and race relations in Jewish women's lives. Offered: jointly with WOMEN 438.

SISJE 452 The Biblical Song of Songs (3) VLPA Noegel Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 452.

SISJE 453 The Biblical Prophets (3) VLPA I&S Noegel Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 453.

SISJE 454 Israel: The First Six Centuries BCE (3) VLPA I&S Noegel Traces the Israelites, from the Babylonian destruction of the Jerusalemite Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with NEAR E 454.

SISJE 455 The Kings of Monarchic Israel (3) VLPA I&S Noegel Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with NEAR E 455.

SISJE 465 The Jews of Eastern Europe (5) I&S Jewish society in Poland, Russia, the Habsburg Lands, and Romania from the late Middle Ages to the Holocaust. Offered: jointly with HSTEU 465.

SISJE 466 The Sephardic Diaspora: 1492-Present (5) I&S *Stein* Examines the history and culture of Sephardic Jewry from the expulsion from the Iberian Peninsula in 1492 to the present. Explores the creation of Sephardic communities in the Dutch and Ottoman Empires, Western Europe, the Americas, and Africa, and the history of the conversos and "hidden Jews." Offered: jointly with HSTEU 466.

SISJE 469 Enlightenment, Emancipation, Antisemitism: History of the Jews, 1770-1914 (5) I&S *Stein* The Jewish experience in the modern world from the European Enlightenment to the First World War. Focus on the debates surrounding Jewish emancipation, the reception of Jews within European society, modern antisemitism, nationalist movements, mass migration, and war. Offered: jointly with HSTEU 469.

SISJE 490 Special Topics (1-5, max. 15) I&S Content varies.

SISJE 495 Seminar in Jewish Studies (5) I&S *Jaffee* History of Jewish Studies as an organized field of academic inquiry. Explores the implications for Jewish Studies of its present setting within the context of the humanities and the social sciences.

SISJE 497 Field Archaeology (1-10, max. 20) Professionally-guided archaeological fieldwork at a recognized archeological dig in the United States or abroad. Offered: S.

SISJE 499 Undergraduate Research (1-5, max. 15) .

Latin American Studies

SISLA 120 Introduction to Human Rights in Latin America (5) I&S *Godoy* Overview of human rights issues and how they have evolved in recent Latin American history, from the military dictatorships of the authoritarian period to contemporary challenges faced in the region's democracies. Credit not allowed if LSJ 470/SIS 410 already taken.

SISLA 322 International Political Economy of Latin America (5) I&S Exploration of politics underlying Latin America's economic development. Topics covered include import-substituting industrialization, mercantilism, the debt crisis, neoliberalism, market integration, and poverty. Review of major theoretical perspectives such as modernization theory, dependency, and the new political economy. Offered: jointly with POL S 322.

SISLA 342 Government and Politics of Latin America (5) I&S Analysis of the political dynamics of change in Latin America comparing various national approaches to the political problems of modernization, economic development, and social change. Offered: jointly with POL S 342.

SISLA 355 Social Change in Latin America (5) I&S Explores cultures, identities, political economy, and popular mobilization in Latin America. Examines relations of power and production between social classes and ethnic groups, as well as ideologies and intellectual movements. Offered: jointly with SOC 355.

SISLA 399 Study Abroad: Latin American Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISLA 451 Cultural Geography of Latin America (5) I&S Interdisciplinary senior seminar examining how physical and social geographies are culturally constructed and interconnected with subjectivities and power in Latin America. Topics include identity formation grounded in particular territories and the social constitution of space via an interplay of material and cultural forces. Offered: jointly with GEOG 451.

SISLA 469 Concepts of Cannibalism in the Colonial World (5) I&S *Barbon* Study of textual and iconographic representations of American cannibalism in the 16th and 17th century. Introduction to research produced by literary critics, anthropologists, and historians. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 469.

SISLA 470 Latin American Studies Internship (1-5, max. 10) Off-campus fieldwork with a community national, or international organization, in an apprenticeship or internship situation. Supervised by on-site field supervisor and Latin American Studies faculty member.

SISLA 480 Labor and Popular Movements in Latin America (5) I&S *Bergquist* Interdisciplinary approach to origins and trajectory of labor movement from late nineteenth century to present. Emphasis in contemporary period on popular movements, including neighborhood associations, religious base communities, women's movement, and ethnic mobilization for democratic social and political reform. Recommended: two non-language Latin American studies courses. Offered: jointly with HSTAA 480.

SISLA 485 Cultural Studies of Latin America (5) I&S/VLPA *Steele* Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include, cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 485.

SISLA 486 Photography and Cultural Studies in Latin America (5) I&S/VLPA *Steele* Interdisciplinary exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322 and one additional 300-level course beyond 303. Offered: jointly with SPAN 486.

SISLA 489 The Mexico-U.S. Border in Literature and Film (5) I&S/VLPA *Doremus, Steele* Analysis of the Mexico-U.S. Border region in literature and film of the 1990s and early 2000s. Includes migration, tourism, NGOs, globalization, transnational commerce, multiculturalism, and politics of gender, sexuality and race. Prerequisite: either SPAN 303 or SPAN 316; either SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 489.

SISLA 490 Special Topics (1-5, max. 15) I&S Content varies.

SISLA 492 Latin American Studies Seminar (5, max. 15) I&S .

SISLA 499 Undergraduate Research (1-5, max. 15) .

Middle Eastern Studies

SISME 210 Introduction to Islamic Civilization (5) I&S/VLPA *DeYoung* Major developments in Islamic civilization from advent of Islam in seventh century to present. Islamic history, law, theology, and mysticism, as well as the politics, cultures, and literatures of the various Islamic societies. Offered: jointly with NEAR E 210.

SISME 213 Introduction to the Modern Middle East (5) I&S Major social and political trends in the Middle East during the 18th, 19th, and 20th centuries. Basic principles of Islam and its diversity, changing balance of power during the early modern period; European colonialism and withdrawal; pan-Arabism, nationalism, feminism and religious resurgence. Offered: jointly with NEAR E 213.

SISME 399 Study Abroad: Middle Eastern Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISME 400 The Middle East in the Modern World (5) I&S *Kasaba* Economic, political, and cultural ties between the Middle East and the modern world between the eighteenth century and the present. Particular attention to the transformation of societies, formation of modern states, the relationship between Islam and democracy, and gender and society in the Middle East.

SISME 420 International Humanitarian Law (5) I&S *Lorenz* Investigates International Humanitarian Law (sometimes called the Law of Armed Conflict), the field concerned with rules developed by civilized nations to protect the victims of armed conflict, including the Geneva Conventions. Case studies include the conflict between Israel and the Palestinians, as well as developments in Afghanistan and Iraq.

SISME 430 Economic Development of the Middle East (5) I&S *Kasaba* Comparative examination of economic development in the Middle East. Includes population growth, agrarian change, industrialization, foreign trade, capital flows, and fiscal and monetary policies.

SISME 432 The Middle East and the World Economy (5) I&S *Kasaba* Early nineteenth century to the 1980s. Production and export of agricultural and raw materials, extension of loans and investments by Europeans, commercial exploitation and export of oil as major phases of economic interaction. These phases and their political repercussions; their significance and consequences.

SISME 458 Israel: Politics and Society (5) I&S *Migdal* Examines how parts of the mosaic of Israel's ethnic groups and religions have interacted over time to create today's society. Focus on politics, especially interaction of the state with the mosaic society. The religious divide; the Jewish ethnic divide; Palestinians in Israel; war and its effect on Israel; the long road to peace.

SISME 490 Special Topics (1-5, max. 15) I&S Content varies.

SISME 495 Trends in the Contemporary Middle East (3) I&S Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military

confrontations. Topics vary. Offered: jointly with NEAR E 495.

SISME 499 Undergraduate Research (1-5, max. 15) .

SISME 530 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 531 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 532 Reading Seminar on Middle East Studies (2) Middle Eastern historiography, Islamic law, Islamic theology, relations between the Middle East and the world economy, political structures, social movements in the Middle East. Credit/no credit only.

SISME 560 Seminar in Turkish Studies (2, max. 12) Recent research and writings focused on the Ottoman Empire and modern Turkey. Credit /no credit only.

SISME 590 Special Topics (3-5, max. 10) Content varies.

SISME 600 Independent Study or Research (*) .

SISME 700 Master's Thesis (*) .

Russian, East European, and Central Asian Studies

SISRE 405 Peoples of Russia (5) I&S Traditional cultural and social organizations of the various nationalities in Russia. Particular emphasis on peoples of Siberia. Role of traditional culture in shaping contemporary lifestyles in a multiethnic, diversified setting. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with ANTH 405.

SISRE 410 Writers and Intellectuals of Central Asia (3) I&S/VLPA Covers modern native writers and intellectuals of Central Asia and compares them with writers educated before the revolution of 1917. Prerequisite: NEAR E/SISRE 375.

SISRE 418 Eastern Europe: the Political Economy of the Region (5) I&S *Poznanski* Focus on the classical command-type economy and the most recent economic and political transition in Eastern Europe. Analysis of current institutional reform, privatization, and trade relations.

SISRE 424 Security Affairs of Russia and Eurasia (5) I&S *Jones* Surveys history of Soviet military and Soviet empire from 1917 to 1985, breakup of the USSR during 1985 to 1991, and the emergence of new security issues among those Eurasian states that formally constituted the national components of the USSR and its communist military allies.

SISRE 425 Anthropology of the Post-Soviet States (5) I&S *Bilaniuk* Analysis of Soviet and post-Soviet culture and identity. Historical transformations in Soviet approaches to ethnicity and nationality; contemporary processes of

nationbuilding and interethnic conflict. Examination of culture through the intersection of social ritual, government policies, language, economic practices, and daily life. Regional focus will vary. Offered: jointly with ANTH 425.

SISRE 443 Kievan and Muscovite Russia: 850-1700 (5) I&S *Waugh* Development of Russia from earliest times to the reign of Peter the Great. Offered: jointly with HSTAM 443.

SISRE 444 Imperial Russia: 1700-1900 (5) I&S *Young* Development of Russia from Peter the Great to Nicholas II. Offered: jointly with HSTEU 444.

SISRE 445 Politics and Society Eastern Europe (5) I&S Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with POL S 445.

SISRE 448 Twentieth-Century Russia (5) I&S *Ellison, Young* Russia and the USSR from Nicholas II to the present. Offered: jointly with HSTEU 445.

SISRE 450 Survey of the Cultures of the Turkic Peoples of Central Asia (3) I&S/VLPA Nomadic and sedentary cultures of the Turkic peoples of Central Asia. Emphasis on languages, literature, and adherence to traditional modes of life. Offered: jointly with NEAR E 450.

SISRE 455 Marine Business Environment in Russia and Eastern Europe (3) I&S *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SMA 455.

SISRE 465 Baltic States since 1991 (5) I&S Intensive interdisciplinary survey of social, political and economic developments in Estonia, Latvia, and Lithuania since 1991. Offered: jointly with SCAND 455.

SISRE 490 Special Topics (1-5, max. 15) I&S Topics vary.

SISRE 501 Bibliography and Research Methods (5) Introduction to bibliographic and other scholarly resources in field; development of research techniques. Some use of relevant language required. Required of all first-year MAIS students.

SISRE 502 Thesis Seminar (3) Required of all second-year MAIS students. Credit/no credit only.

SISRE 504 Approaches to East European Politics (3-5) Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and southeastern Europe. Prerequisite: permission of instructor. Offered: jointly with POL S 537.

SISRE 505 Seminar: Problems of Social and Political Development in Eastern Europe (3-6, max. 6) Research seminar dealing with selected problems of continuity and change in eastern Europe. Prerequisite: some previous course work on eastern Europe.

SISRE 555 Comparative Marine Business in the North Pacific (3) Strategies of Russian, Canadian, Japanese, and American enterprises and governments in promotion of marine business in the North Pacific. Socio-economic characteristics of the four powers; role of public and private sectors in foreign trade and investment; Russia's transition to free-market economic system; and business practices in the region. Offered: jointly with SMA 555.

SISRE 590 Special Topics (2-5, max. 10) Course content varies. Offered occasionally by visitors or resident faculty.

SISRE 600 Independent Study or Research (*).

SISRE 700 Master's Thesis (*).

South Asian Studies

SISSA 200 South Asia Today (5) I&S Interdisciplinary introduction to the field of South Asian Studies. Overview of the topographic, social, and linguistic geography and history of India, Pakistan, Bangladesh, Sri Lanka, and Nepal. Examines politics, economy, social structure, religion, cultural production and the arts, popular culture, and transnationalism.

SISSA 316 Modern South Asia (5) I&S *Sivaramakrishnan* Twentieth-century history and society of Indian subcontinent. Topics include nationalism, rural and urban life, popular culture gender and environmental politics. Offered: jointly with ANTH 316.

SISSA 339 Social Movements in Contemporary India (5) *Ramamurthy, Sivaramakrishnan* Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with WOMEN 339/ANTH 339.

SISSA 340 Government and Politics of South Asia (5) I&S Comparison of problems of national integration and political development in India, Pakistan, and Ceylon. Offered: jointly with POL S 340.

SISSA 341 Political Violence and the Post-Colonial State in South Asia (5) I&S Examines theoretical approaches to the analysis of collective, state, and anti-state violence in post-colonial South Asia through the study of specific cases of political violence in modern India, Pakistan, Sri Lanka, and Nepal. Offered: jointly with ANTH 341.

SISSA 343 Comparative Geographies of Youth (5) I&S *Jeffrey* Examines how three key global processes - rising levels of formal education, changing health regimes, and environmental transformation - are shaping youth in the US and South Asia. Examines ways young people rework broader structures, paying particular attention to their economic livelihoods, cultural practices, and political engagements. Offered: jointly with GEOG 343; A.

SISSA 386 Introduction to the Philosophical Systems of India (5) I&S *Potter* Fundamental views of classical Indian philosophical schools on epistemology and metaphysics through readings in translation of basic works. Nyaya, Vaisheshika, Samkhya, Yoga, Jain philosophy, Vijnanavada and Madhyamika Buddhism, Advaita Vedanta,

and later developments. Offered: jointly with PHIL 386.

SISSA 399 Study Abroad: South Asian Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISSA 417 Political Economy of India (5) I&S Analysis of relationships among processes of economic change, political institutions, and structures of political power in contemporary India. Includes contrasting approaches to Indian economic development, land reform, radical and agrarian political movements, and role of foreign aid. Offered: jointly with POL S 417.

SISSA 434 International Relations of South Asia (5) I&S Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with POL S 434.

SISSA 436 Social and Political Geographies of South Asia (5) I&S *Jeffrey* Introduces the social and political geographies of South Asia through reference to agrarian change in India. Outlines key concepts related to the reproduction of inequality in the region, particularly theories of caste, class, gender, and religious communalism, and examines the mechanisms through which these inequalities are reproduced in South Asia. Offered: jointly with GEOG 436, Sp.

SISSA 490 Special Topics (1-5, max. 15) I&S Topics vary.

SISSA 494 Ramayana in Comparative Perspective (5) VLP *Pauwels* Examines and compares different versions (mainly South Asian) of the Ramayana, including the widely popular television version. Focuses on some famous and controversial passages, with special attention to gender issues. Incorporates background readings from the most recent research. Offered: jointly with ASIAN 494.

SISSA 498 Undergraduate Colloquium on South Asia (5) I&S Interrelationship of the various social science disciplines in the study of South Asian history and culture.

SISSA 499 Undergraduate Research (1-5, max. 15) .

SISSA 536 Advanced Research Seminar on South Asian Geographies (5) Jeffrey Examines geographies of social inequality in South Asia through reference to how space, place, and the environment are shaping practices of political struggle in the region. Considers how liberalization, democratization and religious communalization are changing the political geography of South Asia. Offered jointly with GEOG 536, Sp.

SISSA 539 Social Movements in Contemporary India (5) Ramamurthy, Sivaramakrishnan Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with WOMEN 539/ANTH 539.

SISSA 590 Special Topics (2-5, max. 10) Seminar. Course content varies. Offered occasionally by visitors or resident faculty.

SISSA 600 Independent Study or Research (*).

SISSA 700 Master's Thesis (*).

Southeast Asian Studies

SISSE 221 History of Southeast Asia (5) I&S *Giebel, Sears* Surveys Southeast Asian civilizations at the outset of Western colonial rule; the colonial impact on the traditional societies of Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Indonesia, and the Philippines; nineteenth- and twentieth-century nationalist and revolutionary movements; emergence of Southeast Asia as a region in the modern world. Offered: jointly with HSTAS 221.

SISSE 265 The Viet Nam Wars (5) I&S *Giebel* Recent Vietnamese history and struggles for independence and national unification *vis-a-vis* French colonialism, Japanese occupation, American intervention, and internal divisions. Covers historical roots and contemporary contexts of revolution and war, objectives and motivations of participants, and the enormous human costs. Emphasizes socio-cultural changes and wars' legacies. Offered: jointly with HSTAS 265.

SISSE 314 Culture, Environment, and Identity in Island Southeast Asia (5) I&S *Lowe* Anthropological study of colonial and post-colonial contexts of Island Southeast Asia. Emphasis on historical legacies, influence of world religions, formation of national and collective identities, revolution and national politics, and modernities. Prerequisite: either one 200-level ANTH course, LING 203, or one SIS course. Offered: jointly with ANTH 314.

SISSE 315 Southeast Asian Civilization: Buddhist and Vietnamese (5) I&S *Keyes* Civilizations of Theravada Buddhist societies in Burma, Thailand, Cambodia, and Laos and in Vietnamese societies of Southeast Asia. Culture of tribal peoples who live on peripheries of these societies. Cultural transformations consequent upon the war in Indochina and resettlement of Indochinese refugees in United States. Offered: jointly with ANTH 315.

SISSE 343 Politics and Change in Southeast Asia (5) I&S *Callahan* Government and politics in the countries of Southeast Asia, with attention given to the nature of the social and economic environments that condition them. Offered: jointly with POL S 343.

SISSE 399 Study Abroad: Southeast Asian Studies (1-5, max. 15) I&S For participants in study abroad program. Specific course content varies. Courses do not automatically apply to major/minor requirements.

SISSE 420 Southeast Asian Knowledge and the Politics of Information (5) I&S *Henchy* Overview of information resources in and about Southeast Asia, including evaluation of those sources within various theoretical articulations (scholastic, cultural, and political). Pedagogical implications of the life cycle of information; critique of these implications from various theoretical and cultural viewpoints.

SISSE 445 Literature and Society in Southeast Asia (5, max. 10) I&S/VLP *Keyes* Focus on either Vietnam or Thailand. Provides students with opportunity to explore how those living in Southeast Asia have reflected on the radical social changes their societies have undergone through novels, short stories, and

poetry. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with ANTH 445.

SISSE 465 The Viet Nam Wars (5) I&S *Giebel* Recent Vietnamese history and struggles for independence and national unification *vis-a-vis* French colonialism, Japanese occupation, American intervention, and internal divisions. Covers historical roots and contemporary contexts of revolution and war, objectives and motivations of participants, and the enormous human costs. Emphasizes socio-cultural changes and wars' legacies. Offered: jointly with HSTAS 465.

SISSE 466 Islam, Mysticism, Politics and Performance in Indonesian Culture (5) I&S/VLP *A* Shows how Indonesia, the world's fourth most-populous country, with the largest Islamic population, weaves together local practices and influences from India and Persia. Offers ways of understanding modern Indonesian performing arts, religion, and politics. Offered: jointly with HSTAS 446.

SISSE 469 Topics in Southeast Asian History and Society (5) I&S Introduces major issues within the history and culture of one country of Southeast Asia. Content varies. Topics may include religion, economics, colonialism, perspectives on gender, labor history, literatures, popular culture, and performing arts. Focuses on a different Southeast Asian country each time offered.

SISSE 490 Special Topics in Southeast Asian Studies (1-5, max. 15) I&S Content varies.

SISSE 499 Undergraduate Research (1-5, max. 15) .

Linguistics

French Linguistics

FRLING 400 The Syntactic Structure of French (5) VLP *A* Scientific study of the syntax of French: phrase structure and movement, with emphasis on passives, relatives, and interrogatives. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 401 The Morphological Structure of French (5) VLP *A* *Klausenburger* Linguistic study of French morphology. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 402 The Phonological Structure of French (5) VLP *A* *Klausenburger* The phonological component of the generative grammar of French: representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 403 Background of Modern French (5) VLP *A* *Klausenburger* Linguistic analysis of the important developments in the history of the French language from its Latin origin to contemporary speech. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 405 Linguistics and the Teaching of French (5) VLP *A* *Herschensohn* Areas of linguistics that can be particularly helpful to the French teacher. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

FRLING 406 Advanced French Grammar (5) VLPA *Herschensohn* Problems of French grammar. Differences between forms and structures of French and English. Problems of effective teaching of French. Prerequisite: FRENCH 303.

FRLING 409 The Phonetics of French (5) VLPA *Klausenburger* Scientific study of the French sound system with special emphasis on "lower level" phonetic rules. Focus on data from standard French as well as socioeconomic and geographic variations. Prerequisite: either FRENCH 203, FRENCH 223, or FRENCH 234; either LING 200 or LING 400.

Linguistics

LING 100 Fundamentals of Grammar (5) VLPA Introduction to basic grammatical concepts and terminology. Specifically intended for students planning to take a foreign language or linguistics. Does not count toward the linguistics major or minor.

LING 101 Fundamentals of Pronunciation for Language Learners (5) VLPA *Kaisse* Fundamentals of pronunciation for language learners. Introduces students to systematic characteristics of language sounds through examination of specific languages and their differences from English. Includes a laboratory component developing perceptual and productive skills of non-English sounds.

LING 200 Introduction to Linguistic Thought (5) I&S/VLPA, QSR Language as the fundamental characteristic of the human species; diversity and complexity of human languages; phonological and grammatical analysis; dimensions of language use; language and writing; impact of historical linguistics on contemporary theory. Not open for credit to students who have completed LING 201.

LING 201 Introduction to Linguistic Theory and Analysis (5) I&S/VLPA, QSR Background and scope of modern linguistics; behaviorist versus rationalist theories of language; universal and cognitive aspects of language structure; interplay of genetic and social factors in language formation; linguistic analysis. Not open for credit to students who have completed LING 200.

LING 203 Introduction to Anthropological Linguistics (5) I&S/VLPA *Hargus, Hunn, Palmer* Linguistic methods, theories used within anthropology. Basic structural features of language; human language and animal communication compared; evidence for the innate nature of language. Language and culture: linguistic relativism, ethnography of communication, sociolinguistics. Language and nationalism, language politics in the U.S. and elsewhere. Offered: jointly with ANTH 203.

LING 220 Origins of the Germanic Languages (5) VLPA *Barrack, Voyles* Introduction to basic grammatical concepts, terminology, and linguistics with emphasis on German-English relationship. Overview of phonology, morphology, syntax, and history of Germanic languages and people, both ancient and modern. Languages covered include Old, Middle, and New High German; English, Frisian, Dutch, Old Saxon, and Gothic. Taught in English. Offered: jointly with GERMAN 220; AWSpS.

LING 242 Introduction to Meaning (5) VLPA *Ogihara* Non-technical introduction to meaning in

language and how it functions in communication and thinking. Discussion of how and why meanings of words change through time. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 270 Introduction to Perl Programming for Linguists (5) Bender Fundamental programming techniques, including data types, control flow, regular expressions, file handling, GUI design, and CGI interaction. Content relates to a variety of linguistic concepts including syntax, morphology, phonology, lexicon building and foreign language corpora. No previous programming necessary; however, a background in general linguistic theory is assumed. Offered: W.

LING 300 Introduction to the Languages of the World (5) VLPA *Brame, Klausenburger* A survey of the world's languages, focusing on their syntactic, phonological, and morphological properties. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 333 Linguistics and Society (3) I&S/VLPA Interaction of language, culture, and society, and the relationship of linguistic theory to societal problems. Ethical and political considerations involved in the application of linguistic theory.

LING 347 Psychology of Language I (5) I&S/VLPA *Corina, Osterhout* Introduction to the study of language, including language structure, speech perception, language acquisition, psychological processes underlying comprehension and production of language, the relation between brain and language, and the question of the species-specificity of human language. Prerequisite: 2.0 in either PSYCH 209 or either LING 200 or LING 201. Offered: jointly with PSYCH 347.

LING 372 Language and Translation (5) VLPA *Tarlinskaja* Role of linguistic concepts in the process of translation from one language to another. Attention to both language universals and language particulars.

LING 390 Foreign Studies in Linguistics (3-5, max. 10) I&S For students who take linguistics courses while participating in a University of Washington study abroad program and for which there is no direct University of Washington equivalent.

LING 400 Survey of Linguistic Method and Theory (5) I&S/VLPA, QSR Major linguistic theories in phonology, syntax and semantics; linguistic analysis and argumentation. Intended for students who plan to pursue further linguistic or language-related study. Students who have taken LING 200 or 201 should not take LING 400, although credit is allowed for both if 400 is taken after 200 or 201.

LING 401 The Linguistic, Philosophical, and Political Thought of Noam Chomsky (3) I&S/VLPA Relation of current work in Chomskyan linguistics to philosophical, psychological, political, and educational thought.

LING 402 Survey of the History of Linguistics (3) I&S/VLPA *Newmeyer* Main trends in linguistic theory and philosophy of linguistics from ancient times through advent of transformational-generative grammar. Includes nineteenth-century comparative and historical grammar, Prague school grammar, American structuralist grammar,

major concerns of linguistics today. Prerequisite: LING 451.

LING 403 Structure of American Sign Language (5) VLPA *Hargus* Introduction to the phonological, morphological, and syntactic structure of American Sign Language. Topics include acquisition, sociolinguistics, neurolinguistics, lexicography, history, and culture. Knowledge of American Sign Language is not required. Prerequisite: LING 200, 201, 203, or 400.

LING 404 Indo-European (3) VLPA *Voyles* Overview of the Indo-European languages, of comparative method, and of the phonology, morphology, and syntax of reconstructed Indo-European. Grammatical analyses and texts from various attested ancient and modern Indo-European languages, selected according to the interests of the students.

LING 405 Indo-European (3) VLPA *Voyles* Overview of the Indo-European languages, of comparative method, and of the phonology, morphology, and syntax of reconstructed Indo-European. Grammatical analyses and texts from various attested ancient and modern Indo-European languages, selected according to the interests of the students.

LING 406 Indo-European (3) VLPA *Voyles* Overview of the Indo-European languages, of comparative method, and of the phonology, morphology, and syntax of reconstructed Indo-European. Grammatical analyses and texts from various attested ancient and modern Indo-European languages, selected according to the interests of the students.

LING 411 Native Languages and Language Families of Washington State (3) VLPA *Hargus* Survey of linguistic structures of Washington native languages. Language families consist of Salish, Wakashan, Chemakuan, Athabaskan, Chinookan, Sahaptian, Cayuse. Structure and origin of Chinook jargon. Prerequisite: LING 450; either LING 461 or LING 481.

LING 415 History of the German Language (5) VLPA Traces the history of the German language from early Germanic to the present. Recommended: LING 200 and GERMAN 203 Offered: jointly with GERMAN 452.

LING 419 The Development of the Italian Language (5) VLPA Historical survey of Italian phonology, morphology, and syntax. Evolution of the language is illustrated with study of pertinent documents from various periods. Prerequisite: ITAL 303; either LING 400 or ROLING 401. Offered: jointly with ITAL 400.

LING 432 Sociolinguistics I (5) I&S/VLPA *Wassink* Social variation in the phonology, morphology, syntax, lexicon of languages and dialects. Nonstandard language, diglossia, pidgins and creoles, gender differences, bi- and multilingualism, ethnography of speaking, pragmatics, and language attitudes. Prerequisite: either LING 200 or LING 400; recommended: prior or concurrent registration in LING 450. Offered: jointly with ANTH 432.

LING 433 Language Politics and Cultural Identity (3) I&S/VLPA *Bilaniuk* Theories and case studies of the power of language as how it is manipulated. Multilingualism, diglossia. Role of language and linguistics in nationalism. Standardization, educational policy, language and ethnicity. World languages, language death

and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with ANTH 464.

LING 434 Sociolinguistics II (3) I&S/VLPA
Wassink Examines field methods linguists use in socially oriented studies of language variation and change. Students learn to target and design interviews appropriate for eliciting specific kinds of linguistic data. Discussion of issues related to recording, ethics, and analysis of large bodies of data. Prerequisite: LING 432. Offered: jointly with ANTH 433.

LING 441 Linguistics and Poetic Language (3) VLPA Introduction to the Relationship between linguistic structures, linguistic universals, and the poetic uses of language; linguistic description in the analysis of literature. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 442 Semantics I (5) NW/VLPA *Ogihara* Introduction to the study of meaning as part of linguistic theory. Relation of semantics to syntax. Emphasis on formal semantics and pragmatics. Discussion of various semantic phenomena in natural language that are theoretically relevant. Prerequisite: LING 461, Syntax 1.

LING 443 Philosophy and Linguistics (3) I&S/VLPA Philosophical problems that arise in the attempt to understand current linguistic theories and the implications of linguistics for philosophy. Offered: jointly with PHIL 443.

LING 444 Philosophy of Language-Pragmatics (3) I&S/VLPA *Potter* Language as communicative activity. Speech act theory in Austin, Grice, and contemporary writings. Applications to problems of reference, presupposition, metaphor, relativism. Offered: jointly with PHIL 444.

LING 445 Descriptive Aspects of English as a Foreign Language (3) VLPA Linguistic analysis as a basis for the teaching of English as a foreign language; language as rule-governed behavior. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 446 Descriptive Aspects of English: Phonology and Morphology (3) VLPA *Hargus, Kaisse* Descriptively oriented analysis of English phonology and morphology; dialect differences. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 447 Psychology of Language II (4) I&S/VLPA *Corina, Osterhout* Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: 2.0 in either PSYCH 347, PSYCH 355, or LING 400. Offered: jointly with PSYCH 447.

LING 449 Second-Language Learning (5) VLPA *Herschensohn, Tarlinskaja* Issues related to the linguistic aspects of second-language learning. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 450 Introduction to Linguistic Phonetics (5) NW/VLPA *Wright* Introduction to the articulatory and acoustic correlates of phonological features. Issues covered include the mapping of dynamic events to static representations, phonetic evidence for phonological description, universal constraints on phonological structure, and implications of psychological speech-sound categorization for phonological theory. Prerequisite: either LING 200 or LING 400.

LING 451 Phonology I (5) I&S/VLPA *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 450.

LING 452 Phonology II (5) I&S/VLPA *Hargus, Kaisse* Speech sounds, mechanism of their production, and structuring of sounds in languages; generative view of phonology; autosegmental and metrical phonology. Prerequisite: LING 451.

LING 453 Experimental Phonetics (5) I&S/NW/VLPA *Hargus, Kaisse* Examines phonetic and phonological aspects of spoken language using experimental methods. Focuses on acoustic phonetics and speech perception. Significant time devoted to experimental design and hands-on data analysis techniques. Prerequisite: LING 451.

LING 454 Methods in Comparative Linguistics (3) VLPA *Klausenburger, Shapiro, Voyles* Method and theory of historical and comparative linguistics. Problems of phonological, morphological, syntactic, and semantic change and reconstruction. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400.

LING 455 Areal Linguistics (3, max. 6) I&S/VLPA Issues involved in classification of languages. Systems of classification based on structure, word order, areal features. Ways in which languages may be classified for different purposes. Processes such as borrowing, vocabulary specialization, lexical change, and language death and revival. Prerequisite: either LING 200, LING 201, ANTH/LING 203, or LING 400. Offered: jointly with ANTH 455.

LING 457 Language Development (5) I&S/VLPA First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: 2.0 in either PSYCH 206, PSYCH 306, LING 200, or LING 400. Offered: jointly with PSYCH 457.

LING 458 Language and Gender (5) I&S, VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450/WOMEN 450.

LING 461 Syntax I (5) I&S/VLPA *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: either LING 200 or LING 400.

LING 462 Syntax II (5) I&S/VLPA *Brame, Contreras, Kim, Newmeyer, Zagona* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: LING 461.

LING 463 Syntax III (4) I&S/VLPA *Brame, Contreras, Kim, Newmeyer* Study of the structural properties of language; introduction to generative transformational syntax. Prerequisite: LING 462.

LING 472 Introduction to Computational Linguistics (5) NW/VLPA *Hoard* Introduction to computer applications of linguistic theory,

including syntactic processing, semantic and pragmatic interpretation, and natural language generation. Prerequisite: either LING 200 or LING 400; either LING 461 or CSE 321. Offered: jointly with CSE 472.

LING 476 Philosophy of Language (5) I&S/VLPA Current theories of meaning, reference, predication, and related concepts. Offered: jointly with PHIL 453.

LING 479 Semantics II (3) I&S/ NW/VLPA *Ogihara* Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal semantics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with PHIL 479.

LING 480 Topics in Linguistics (3, max. 12) VLPA Introduction to an area of linguistic study not covered by the regular departmental course offerings.

LING 481 Introduction to Morphology (5) VLPA *Brame, Hargus, Kaisse, Newmeyer* Structure of words and the processes by which they are formed. Morphological processes in a wide variety of languages. Prerequisite: either LING 200 or LING 400.

LING 484 Lexical Semantics and the Lexicon (3) VLPA *Kim* Role of the lexicon in syntax and semantics. Topics include the syntax-lexicon mapping; theories of argument structure; complex predicate formation and lexical subordination; the lexicon and language acquisition; the role of the lexicon in linguistic theory; and the lexicon and sentence processing. Prerequisite: LING 461.

LING 490 Undergraduate Fieldwork (1-3, max. 6) Individual consultation with faculty member and supervised practical experience in a broad range of industry, community, clinical settings dealing with linguistic issues. Credit/no credit only. Offered: AWPSP.

LING 499 Undergraduate Research (1-5, max. 10) Credit/no credit only.

LING 501 Field Methods (3) Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisite: LING 452, LING 462, or LING 508.

LING 502 Field Methods (3) Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisite: LING 452, LING 462, or LING 508.

LING 503 Field Methods (3) Guided analysis of a language unfamiliar to all students of the class; construction of a grammar based on material elicited from native informant. Prerequisite: LING 453, LING 462, or permission of instructor.

LING 507 Syntactic Theory I (4) Introduction to the principles and parameters model of syntactic theory. The lexicon and its relation to syntactic representations. Syntactic modules and principles. Problem solving.

LING 508 Syntactic Theory II (4) Further explorations in principles and parameters syntax. Topics include logical form, island phenomena, locality restrictions, and licensing. Prerequisite: LING 507 or permission of instructor. Offered: W.

LING 509 Syntactic Theory III (4) Focus on primary readings in syntactic theory, from classic

papers on constraints and the architecture of grammar to recently published articles. Prerequisite: LING 508 or permission of instructor. Offered: Sp.

LING 514 Seminar in Comparative Linguistics (3) *Kaisse* Nineteenth- and twentieth-century theories of phonological change. Prerequisite: LING 404 or permission of instructor.

LING 515 Topics in the History of Germanic Languages (5) *Barrack, Voyles* Topics in diachronic studies of Germanic languages such as Gothic, Old High German, Old Saxon.

LING 519 Mathematical Models of Grammar (3) *Brame, Ogihara* Study of some mathematical models of language recognition, emphasizing context-free and context-sensitive grammars. Prerequisite: graduate standing in mathematics, linguistics, or psychology, or permission of instructor.

LING 522 Topics in the History of Linguistics (3) *Newmeyer* Intensive investigation of the main trends in the history of linguistics, concentrating on the development of nineteenth-century historical linguistics, the various schools of structural linguistics, and transformational-generative grammar. Prerequisite: LING 451.

LING 524 Seminar in Theoretical Linguistics (4, max. 8) Individual and joint research on selected topics in theoretical linguistics. Topics change each quarter. Typical topics are semantics, generative grammar, phonological theories. Prerequisite: LING 453, LING 463.

LING 525 Seminar in Theoretical Phonology (4, max. 12) Individual and joint research on selected topics in theoretical phonology. Topics vary. Typical offerings include phonology and the lexicon, syntax and phonology, phonological representations. Prerequisite: LING 452.

LING 530 Dialectology (3) The principles of dialect deviation as related to linguistic structure and usage. Prerequisite: LING 452, LING 462, LING 508, or permission of instructor. Offered: jointly with ANTH 530.

LING 531 Problems in Romance Linguistics (2-5, max. 15) Group seminar, or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with ROLING 531.

LING 550 Advanced Phonology (2-3) *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 551 Advanced Phonology (2-3) *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 552 Advanced Phonology (2-3) *Hargus, Kaisse* Problems in phonological theory, generative phonology, phonological change. Theories of prosody. Prerequisite: LING 452.

LING 553 Analysis of Linguistic Structures (3, max. 6) Syntactic, semantic, and/or phonological analysis. Languages to be analyzed vary. Prerequisite: permission of instructor. Offered: jointly with ANTH 553.

LING 554 Advanced Linguistic Phonetics (3, max. 9) *Wright, Wassink* Individual and joint

projects on selected topics in theoretical and experimental phonetics. Topics may include articulatory timing, the phonetics phonology interface, and constraints and constraint interaction. Prerequisite: LING 450 or LING 452. Offered: Sp.

LING 561 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 562 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 563 Advanced Syntax (2-3, max. 9) Advanced study in modern syntactic theory. Topics change each quarter. Typical topics are history of transformational grammar, anaphora, logical form. Prerequisite: LING 461, LING 462.

LING 565 Contrastive Linguistics (3) The attempt to look across linguistic systems for comparable and contrastive classes and subclasses. Problems of subcategorization and universal grammar. Three conceptually distinct models: structural, transfer grammar, generative. Prerequisite: LING 452, LING 463.

LING 566 Introduction to Syntax for Computational Linguistics (3) *Bender* Introduction to syntactic analysis and concepts with emphasis on the formally precise encoding in linguistic hypotheses and the design of grammars that can be scaled to practical applications. Coursework progressively builds up a consistent grammar for a fragment of English, while also considering data and phenomena from other languages. Offered: A.

LING 567 Knowledge Engineering for Deep Natural Language Processing (3) *Bender* Techniques and theoretical issues relating to the development of knowledge engineering resources required for deep processing (symbolic or hybrid), focusing on grammar engineering and semantic representations.

LING 575 Topics in Computational Linguistics (3, max. 15) In-depth study of a particular area of computational linguistics, with hands-on experience. Prerequisite: LING 570 and 571, or permission of instructor. Offered: WSp.

LING 579 Comparative Altaic Linguistics (3) Comparative phonology and morphology of Mongolian, Turkic, and other Altaic languages. Prerequisite: permission of instructor. Offered: jointly with ALTAI 579.

LING 580 Problems in Linguistics (2-3, max. 12) Advanced study in current theories of syntax, semantics, phonology, or morphology.

LING 590 Graduate Fieldwork (1-3, max. 6) Individual consultation with faculty member and supervised practical experience in a broad range of industry, community, clinical settings dealing with linguistic issues. Offered: AWSpS.

LING 599 Linguistics Colloquium (1, max. 6) Seminar attended by faculty and graduate students to discuss research in progress and topics of general interest. Presentation of two seminars required for doctoral students. Prerequisite: permission of instructor.

LING 600 Independent Study or Research (*) .

LING 700 Master's Thesis (*) .

LING 800 Doctoral Dissertation (*) .

Romance Linguistics

ROLING 402 Historical Romance Linguistics (5) *VLPA Klausenburger* Comparative historical survey of the development of the principal Romance tongues. Prerequisite: LING 400.

ROLING 490 Senior Essay (2) *VLPA* Essay on linguistic problem of student's choice written with faculty consultant.

ROLING 505 Advanced Romance Linguistics (5) *Klausenburger, Zagona* Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. Descriptive, comparative, and historical considerations. Prerequisite: permission of instructor.

ROLING 506 Advanced Romance Linguistics (5) *Klausenburger, Zagona* Advanced problems in the phonological, morphological, and syntactical analysis of the Romance languages. Descriptive, comparative, and historical considerations. Prerequisite: permission of instructor.

ROLING 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology.

ROLING 521 Seminar in Romance Linguistics (5) *Contreras, Klausenburger, Zagona* Specific problems in linguistic analysis of the Romance languages. Prerequisite: permission of instructor.

ROLING 522 Seminar in Romance Linguistics (5) *Contreras, Klausenburger, Zagona* Specific problems in linguistic analysis of the Romance languages. Prerequisite: permission of instructor.

ROLING 531 Problems in Romance Linguistics (2-5, max. 15) Group seminar, or individual conferences are scheduled under this number to meet special needs. Prerequisite: permission of graduate program coordinator. Offered: jointly with LING 531.

ROLING 551 Romance Linguistics: History, Methodology, and Bibliography (5) For new graduate students in the Romance linguistics program. History of Romance linguistics and linguistic science in the nineteenth and twentieth centuries as it relates to Romance studies. Comparative and descriptive methods used in contemporary scholarship. Prerequisite: LING 200, LING 400, or equivalent.

ROLING 600 Independent Study or Research (*) .

Spanish Linguistics

SPLING 400 The Syntactic Structure of Spanish (5) *VLPA Strozer, Zagona* Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING

203, LING 400, or SPAN 323. Offered: jointly with SPAN 400.

SPLING 401 The Morphological Structure of Spanish (5) VLPA *Strozer, Zagona* Principles of word formation, including derivational and inflectional morphology. Relationship between inflectional morphology and other components of grammar. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 401.

SPLING 402 The Phonological Structure of Spanish (5) VLPA *Strozer, Zagona* Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 402.

SPLING 403 The Evolution of the Spanish Language (5) VLPA *Zagona* Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 403.

SPLING 406 Advanced Spanish Grammar (5) VLPA *Anderson, Strozer* Problems of Spanish grammar. Difference from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: either SPAN 303 or SPAN 316; SPAN 323. Offered: jointly with SPAN 406.

SPLING 407 Dialects of World Spanish (5) Introduction to dialectal variants of Spanish. Considers standardization and the real academia; variation and change; pragmatics and politeness; Spanish in contact; sound, word formation, and grammar variation. Taught in Spanish. Prerequisite: either SPAN 301 or SPAN 314; either SPAN 323, LING 200, or LING 400. Offered: jointly with SPAN 407.

SPLING 409 Spanish Phonetics (5) VLPA Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, LING 201, LING 203, LING 400, or SPAN 323. Offered: jointly with SPAN 409.

Mathematics

MATH 098 Intermediate Algebra (0) Intermediate algebra equivalent to third semester of high school algebra. Instruction provided by community colleges on UW campus. Extra fee required. Replaces MATH 101. Offered: AWSp.

MATH 100 Algebra (5) Similar to the first three terms of high school algebra. Assumes no previous experience in algebra. Open only to students [1] in the Educational Opportunity Program or [2] admitted with an entrance deficiency in mathematics. Offered: AWSp.

MATH 102 Algebra (5) Similar to the first three terms of high school algebra. Assumes no previous experience in algebra. Open only to students [1] in the Educational Opportunity Program or [2] admitted with an entrance deficiency in mathematics. Offered: AWSp.

MATH 103 Introduction to Elementary Functions (5) Continues the study of algebra begun in 100 and 102 with emphasis on functions (polynomial, rational, logarithmic, exponential, and trigonometric). Open only to students who have completed 102. Prerequisite: either score of 26-56% on MATHEA placement test or MATH 102. Offered: AWSp.

MATH 107 Mathematics: A Practical Art (5) NW, QSR For students who have at least 1.5 years of high school algebra and do not plan to take additional mathematics. The exponential function; how it applies to a wide variety of phenomena. Elementary probability and statistics; their use in a variety of applications. Offered: WSp.

MATH 111 Algebra with Applications (5) NW, QSR Use of graphs and algebraic functions as found in business and economics. Algebraic and graphical manipulations to solve problems. Exponential and logarithm functions; various applications to growth of money. Prerequisite: either 2.0 in MATH 098, 2.0 in MATH 102, 2.0 in MATH 103, score of 49% on MATHIA placement test, score of 35% on MATHPC placement test, or score of 56% on MATHEA placement test. Offered: AWS.

MATH 112 Application of Calculus to Business and Economics (5) NW, QSR Rates of change, tangent, derivative, accumulation, area, integrals in specific contexts, particularly economics. Techniques of differentiation and integration. Application to problem solving. Optimization. Credit does not apply toward a mathematics major. Prerequisite: 2.0 in MATH 111. Offered: WSpS.

MATH 120 Precalculus (5) NW Basic properties of functions, graphs; with emphasis on linear, quadratic, trigonometric, exponential functions and their inverses. Emphasis on multi-step problem solving. Prerequisite: either 2.5 in MATH 098, 3.0 in MATH 103, score of 60% on MATHIA test, score of 40% on MATHPC test, or score of 77% on MATHEA placement test. Offered: AWSpS.

MATH 124 Calculus with Analytic Geometry I (5) NW, QSR First quarter in calculus of functions of a single variable. Emphasizes differential calculus. Emphasizes applications and problem solving using the tools of calculus. Prerequisite: 2.5 in MATH 120, score of 68% on MATHPC placement test, score of 75% on MATHEC placement test, or score of 2 on AP test. Offered: AWSpS.

MATH 125 Calculus with Analytic Geometry II (5) NW Second quarter in the calculus of functions of a single variable. Emphasizes integral calculus. Emphasizes applications and problem solving using the tools of calculus. Prerequisite: either 2.0 in MATH 124, score of 3 on AB advanced placement test, or score of 3 on BC advanced placement test. Offered: AWSpS.

MATH 126 Calculus with Analytic Geometry III (5) NW Third quarter in calculus sequence. Sequences, series, Taylor expansions, and an introduction to multivariable differential calculus. Prerequisite: either 2.0 in MATH 125, 2.0 in MATH 145, 2.0 in MATH 146, score of 5 on AB advanced placement test, or score of 4 on BC advanced placement test. Offered: AWSpS.

MATH 134 Accelerated [Honors] Calculus (5) NW, QSR Covers the material of 124, 125, 126; 307, 308, 318. First year of a two-year

accelerated sequence. May receive advanced placement (AP) credit for 124 after taking 134. For students with above average preparation, interest, and ability in mathematics. Offered: A.

MATH 135 Accelerated [Honors] Calculus (5) NW Covers the material of 124, 125, 126; 307, 308, 318. First year of a two-year accelerated sequence. May receive advanced placement (AP) credit for 125 after taking 135. For students with above average preparation, interest, and ability in mathematics. Offered: W.

MATH 136 Accelerated [Honors] Calculus (5) NW Covers the material of 124, 125, 126; 307, 308, 318. First year of a two-year accelerated sequence. May not receive credit for both 126 and 136. For students with above average preparation, interest, and ability in mathematics. Offered: Sp.

MATH 144 Calculus for Life Sciences (5) NW, QSR *Curtis, Smith, Tuncel* Introduction discrete probability, with examples from the life sciences. Exponential and logarithmic functions: exponential growth and decay. Prerequisite: either 2.5 in MATH 120, score of 68% on MATHPC placement test, score of 75% on MATHEC placement test, or score of 2 on advanced placement test.

MATH 145 Calculus for Life Sciences (5) NW, QSR *Curtis, Smith, Tuncel* Differential and integral calculus, with examples from the life sciences. Applications of the derivative to curve sketching; min/max problems. Antiderivatives and the fundamental theorem of calculus with applications. Continuous probability distributions; Normal and Poisson distribution Prerequisite: either 2.0 in MATH 124, 2.0 in MATH 144, 3.2 in MATH 120, score of 75% on MATH PC placement test, or score of 3 on advanced placement test.

MATH 146 Calculus for Life Sciences (5) NW *Curtis, Smith, Tuncel* Further applications of integration; elementary differential equations, with examples from the life sciences. Growth models; Leslie matrices; compartment models. Prerequisite: either 2.0 in MATH 125 or 2.0 in MATH 145.

MATH 170 Mathematics for Elementary School Teachers (3) NW Basic concepts of numbers and operations. Emphasizes problem solving, communication of mathematical ideas, and analysis of sources of difficulty in learning/teaching these concepts. Credit may not apply toward a mathematics major. Required for elementary education students. Credit/no credit only. Offered: AWS.

MATH 171 Mathematics for Elementary School Teachers (3) NW Basic concepts of geometry. Emphasizes problem solving, communication of mathematical ideas, and analysis of sources of difficulty in learning/teaching these concepts. Credit may not apply toward a mathematics major. Credit/no credit only. Offered: Sp.

MATH 187 Elementary Mathematics Computer Laboratory (1, max. 3) NW Laboratory activities designed to introduce computing as a tool for doing mathematics, to be taken jointly with a designated section of a 100-level mathematics course. Credit/no credit only. Offered: AWSp.

MATH 197 Problem Solving in Mathematics (2, max. 4) NW Lectures and problem sessions in mathematics with applications. Enrollment

restricted to EOP students only. Credit/no credit only. Offered: AWSp.

MATH 198 Special Topics in Mathematics (1-5, max. 15) Independent reading in math. Does not count as credit toward a math major. Credit/no credit only. Offered: AWSpS.

MATH 301 Elementary Number Theory (3) NW Brief introduction to some of the fundamental ideas of elementary number theory. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 136.

MATH 307 Introduction to Differential Equations (3) NW Introductory course in ordinary differential equations. Includes first- and second-order equations and Laplace transform. Prerequisite: either 2.0 in MATH 125 or 2.0 in MATH145. Offered: AWSpS.

MATH 308 Matrix Algebra with Applications (3) NW Systems of linear equations, vector spaces, matrices, subspaces, orthogonality, least squares, eigenvalues, eigenvectors, applications. For students in engineering, mathematics, and the sciences. Credit allowed for only one of MATH 308 or MATH 318. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 146. Offered: AWSpS.

MATH 309 Linear Analysis (3) NW First order systems of linear differential equations, Fourier series and partial differential equations, the phase plane and/or Laplace transforms. Prerequisite: either 2.0 in MATH 307 and either 2.0 in MATH 308 or 2.0 in MATH 318, or 2.0 in MATH 136. Offered: AWSpS.

MATH 310 Introduction to Mathematical Reasoning (3) NW Mathematical arguments and the writing of proofs in an elementary setting. Elementary set theory, elementary examples of functions and operations on functions, the principle of induction, counting, elementary number theory, elementary combinatorics, recurrence relations. Prerequisite: either 2.0 in MATH 125, MATH 145, or MATH 135.

MATH 318 Linear Algebra (3) NW Introduction to the mathematical concepts, arguments, and proofs that occur in linear algebra. Vectors and matrices, systems of linear equations, determinants, subspaces, dimension, bases, linear transformations, eigenvalues and eigenvectors. Credit allowed for only one of MATH 308 or MATH 318. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 146; 2.0 in MATH 310.

MATH 324 Advanced Multivariable Calculus I (3) NW Topics include the chain rule, Lagrange multipliers, double and triple integrals, vector fields, line and surface integrals. Culminates in the theorems of Green and Stokes, along with the Divergence Theorem. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 136. Offered: AWSpS.

MATH 326 Advanced Multivariable Calculus II (3) NW Elementary topology, general theorems on partial differentiation, maxima and minima, differentials, Lagrange multipliers, implicit function theorem, inverse function theorem and transformations, change of variables formula. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308, or 2.0 in MATH 318; 2.0 in MATH 324. Offered: AWSpS.

MATH 327 Introductory Real Analysis I (3) NW Limits and continuity of functions, sequences, series tests, absolute convergence, uniform convergence. Power series, improper integrals,

uniform continuity, fundamental theorems on continuous functions, theory of the Riemann integral. Prerequisite: either both 2.0 in MATH 126 and 2.0 in MATH 310, or 2.0 in MATH 136. Offered: AWSpS.

MATH 328 Introductory Real Analysis II (3) NW Limits and continuity of functions, sequences, series tests, absolute convergence, uniform convergence. Power series, improper integrals, uniform continuity, fundamental theorems on continuous functions, theory of the Riemann integral. Prerequisite: 2.0 in MATH 327. Offered: AWSp.

MATH 334 Accelerated [Honors] Advanced Calculus (5) NW Introduction to proofs and rigor; uniform convergence, Fourier series and partial differential equations, vector calculus, complex variables. Students who complete this sequence are not required to take MATH 309, 310, 324, 326, 327, 328, and 427. Second year of an accelerated two-year sequence; prepares students for senior-level mathematics courses. Prerequisite: either 2.0 in MATH 136, or 2.0 in MATH 126; 2.0 in MATH 307; either 2.0 in MATH 205, 2.0 in MATH 308, or 2.0 in MATH 318. Offered: A.

MATH 335 Accelerated [Honors] Advanced Calculus (5) NW Introduction to proofs and rigor; uniform convergence, Fourier series and partial differential equations, vector calculus, complex variables. Students who complete this sequence are not required to take 309, 324, 326, 327, 328, and 427. Second year of an accelerated two-year sequence; prepares students for senior-level mathematics courses. Prerequisite: 2.0 in MATH 334. Offered: AWSp.

MATH 336 Accelerated [Honors] Advanced Calculus (5) NW Introduction to proofs and rigor; uniform convergence, Fourier series and partial differential equations, vector calculus, complex variables. Students who complete this sequence are not required to take 309, 324, 326, 327, 328, and 427. Second year of an accelerated two-year sequence; prepares students for senior-level mathematics courses. Prerequisite: 2.0 in MATH 335. Offered: Sp.

MATH 354 Math Enrichment for the Schools (5) NW Map and graph coloring, spanning trees, dominating sets, cryptography, interpretation of graphs, circular motion, statistics that mislead, other topics. Focus on middle school level, with sixth or seventh grade classroom visits every week. Discussion of readings on math education reform. Prerequisite: MATH 126. Offered: A.

MATH 355 Math Enrichment for the Schools (5) NW Map and graph coloring, spanning trees, dominating sets, cryptography, interpretation of graphs, circular motion, statistics that mislead, other topics. Focus on middle school level, with sixth or seventh grade classroom visits lasting all Tuesday morning in alternate weeks. Discussion of readings on math education reform. Prerequisite: MATH 354. Offered: W.

MATH 381 Discrete Mathematical Modeling (3) NW Introduction to methods of discrete mathematics, including topics from graph theory, network flows, and combinatorics. Emphasis on these tools to formulate models and solve problems arising in variety of applications, such as computer science, biology, and management science. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308, or 2.0 in MATH 318.

MATH 387 Intermediate Mathematics Computer Laboratory (1-2, max. 6) NW Laboratory activities in the use of computing as tool for doing mathematics, to be taken jointly with a designated section of a 300-level mathematics course. Credit/no credit only.

MATH 390 Probability and Statistics in Engineering and Science (4) NW Concepts of probability and statistics. Conditional probability, independence, random variables, distribution functions. Descriptive statistics, transformations, sampling errors, confidence intervals, least squares and maximum likelihood. Exploratory data analysis and interactive computing. Students may receive credit for only one of 390, STAT/ECON 481, and ECON 580. Prerequisite: either MATH 126 or MATH 136. Offered: jointly with STAT 390; AWSpS.

MATH 394 Probability I (3) NW Sample spaces; basic axioms of probability; combinatorial probability; conditional probability and independence; binomial, Poisson, and normal distributions. Prerequisite: either 2.0 in MATH 126 or 2.0 in MATH 136; recommended: MATH 324 or MATH 327. Offered: jointly with STAT 394; AWS.

MATH 395 Probability II (3) NW Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations. Prerequisite: 2.0 in STAT/MATH 394. Offered: jointly with STAT 395; WSpS.

MATH 396 Probability III (3) NW Characteristic functions and generating functions; recurrent events and renewal theory; random walk. Prerequisite: 2.0 in MATH 395 or 2.0 in STAT 511. Offered: jointly with STAT 396; Sp.

MATH 398 Special Topics in Mathematics (1-5, max. 15) Independent reading in math. Does not count as credit toward a math major. Credit/no credit only. Offered: AWSpS.

MATH 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with AMATH 400/STAT 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSE at the 300 or 400 level, including MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

MATH 402 Introduction to Modern Algebra (3) NW Elementary theory of groups: Cosets and Lagrange's theorem. Homomorphisms, normal subgroups, quotient groups, and the fundamental isomorphism theorems. Cyclic and symmetric groups. Orders and Cauchy's theorem. Direct products. Automorphisms. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 327, 2.0 in MATH 336, or 2.0 in MATH 340. Offered: AS.

MATH 403 Introduction to Modern Algebra (3) NW Elementary theory of rings and fields: polynomial rings. Ideals, homomorphisms, quotients, and fundamental isomorphism theorems. Fields and maximal ideals. Euclidean rings. Field extensions. Algebraic extensions. Vector spaces and degrees of extensions. Adjoining roots of polynomials. Finite fields. Straight edge and compass constructions. Prerequisite: 2.0 in MATH 402. Offered: W.

MATH 404 Introduction to Modern Algebra (3) NW Topics in algebra chosen from Galois theory, theory of modules, geometric group actions, and the theory of rings and fields. Specific content determined by instructor. Prerequisite: 2.0 in MATH 403. Offered: Sp.

MATH 407 Linear Optimization (3) NW

Maximization and minimization of linear functions subject to constraints consisting of linear equations and inequalities; linear programming and mathematical modeling. Simplex method, elementary games and duality. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308, 2.0 in MATH 318, or 2.0 in AMATH 352. Offered: AWS.

MATH 408 Nonlinear Optimization (3) NW

Maximization and minimization of nonlinear functions, constrained and unconstrained; nonlinear programming problems and methods. Lagrange multipliers; Kuhn-Tucker conditions, convexity. Quadratic programming. Prerequisite: either 2.0 in MATH 308 or 2.0 in MATH 318; either 2.0 in MATH 327 or 2.0 in MATH 334. Offered: W.

MATH 409 Discrete Optimization (3) NW

Maximization and minimization problems in graphs and networks (shortest paths, minimum spanning trees, maximum flows, minimum cost flows); transportation and trans-shipment problems, NP-completeness. Prerequisite: 2.0 in MATH 407. Offered: Sp.

MATH 411 Introduction to Modern Algebra for Teachers (3) NW

Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Cannot be used as elective credit for either BS program in mathematics. Prerequisite: either 2.0 in MATH 205, 2.0 in MATH 308, 2.0 in MATH 318, or 2.0 in MATH 136. Offered: AS.

MATH 412 Introduction to Modern Algebra for Teachers (3) NW

Basic concepts of abstract algebra with an emphasis on problem solving, constructing proofs, and communication of mathematical ideas. Designed for teaching majors; not open for credit to students who have taken 402, 403. Cannot be used as elective credit for either BS program in mathematics. Prerequisite: 2.0 in MATH 411. Offered: WS.

MATH 414 Number Theory (3) NW

Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: either 2.0 in MATH 301 or 2.0 in MATH 402.

MATH 415 Number Theory (3) NW

Congruences, arithmetic of quadratic fields, binary quadratic forms, Dirichlet's theorem on primes in an arithmetic progression, Chebyshev's theorem on distribution of primes, the partition function, equations over finite fields. Prerequisite: 2.0 in MATH 414.

MATH 420 History of Mathematics (3) NW

Survey of the development of mathematics from its earliest beginnings through the first half of the twentieth century. Prerequisite: either 2.0 in MATH 402 or 2.0 in MATH 411, either of which may be taken concurrently. Offered: S.

MATH 421 Conceptual Calculus for Teachers (4) NW

In-depth conceptual study of calculus, approached from many points of view, including the study of patterns of physical change, discrete approximation to continuous phenomena, and the historical development of calculus. Intended for future teachers. Cannot be used as elective credit for either BS program in mathematics.

MATH 422 Conceptual Calculus for Teachers (3) NW

In-depth conceptual study of calculus, approached from many points of view, including the study of patterns of physical change, discrete approximation to continuous phenomena, and the historical development of calculus. Intended for future teachers. Cannot be used as elective credit for either BS program in mathematics.

MATH 424 Fundamental Concepts of Analysis (3) NW

The real number system; field, order, and LUB axioms. Metric spaces: Euclidean space. Bolzano-Weierstrass property. Sequences and limits of Sequences. Cauchy sequences and completeness. The Heine-Borel Theorem. Uniform continuity. Connected sets and the intermediate value theorem. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

MATH 425 Fundamental Concepts of Analysis (3) NW

One-variable differential calculus: chain rule, inverse function theorem, Rolle's theorem, intermediate value theorem, Taylor's theorem, and intermediate value theorem for derivatives. Multivariable differential calculus: mean value theorem, inverse and implicit function theorems, and Lagrange multipliers. Prerequisite: either 2.0 in MATH 326 or 2.0 in MATH 335; 2.0 in MATH 424. Offered: W.

MATH 426 Fundamental Concepts of Analysis (3) NW

Lebesgue measure on the reals. Construction of the Lebesgue integral and its basic properties. Monotone Convergence Theorem, Fatou's Lemma, and Dominated Convergence Theorem. Integration of series. Continuity and differentiability theorems for functions defined by integrals. Introduction to general measures and integration. Prerequisite: 2.0 in MATH 425. Offered: Sp.

MATH 427 Topics in Applied Analysis (3) NW

Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 327 or 2.0 in MATH 335; recommended: MATH 328. Offered: AS.

MATH 428 Topics in Applied Analysis (3) NW

Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 335 or 2.0 in MATH 309 and 2.0 in MATH 327. Offered: W.

MATH 429 Topics in Applied Analysis (3) NW

Elementary functions of a complex variable; Cauchy integral formula. Taylor and Laurent series; conformal mapping. Fourier series; orthogonal functions; boundary value problems; applications. Prerequisite: either 2.0 in MATH 427 or 2.0 in MATH 336; 2.0 in MATH 428. Offered: Sp.

MATH 435 Introduction to Dynamical Systems (3) NW

Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 335 or 2.0 in MATH 327; either 2.0 in MATH 309 or 2.0 in AMATH 352 and 2.0 in AMATH 353.

MATH 436 Introduction to Dynamical Systems (3) NW

Examples of dynamical systems in mathematics and in natural phenomena. Iterated functions, phase portraits, fixed and periodic points. Hyperbolicity, bifurcations. *Chaos*. Interval maps; quadratic families. Fractals; iterated function systems. Elements of higher dimensional dynamics. Julia sets, the Mandelbrot set. Prerequisite: 2.0 in MATH 435.

MATH 438 Introduction to Partial Differential Equations (3) NW

Integral curves and surfaces of vector fields, initial value problems for first-order linear and quasi-linear equations, Cauchy-Kovalevsky theorem, general Cauchy problem characteristics, special equations. Prerequisite: either 2.0 in both MATH 309 and MATH 326 or 2.0 in MATH 336.

MATH 439 Introduction to Partial Differential Equations (3) NW

Continuation of 438. Laplace's equation and general elliptic equations, wave equation and general hyperbolic equations, heat equation and general parabolic equations. Initial value problems and Dirichlet problems. Green's functions. Maximum principle. Prerequisite: 2.0 in MATH 438.

MATH 441 Topology (3) NW

Metric and topological spaces, convergence, continuity, finite products, connectedness, and compactness. Prerequisite: either 2.0 in MATH 328 or 2.0 in MATH 335. Offered: A.

MATH 442 Differential Geometry (3) NW

Curves in 3-space, continuity and differentiability in 3-space, surfaces, tangent planes, first fundamental form, area, orientation, the Gauss Map. Prerequisite: either 2.0 in MATH 335, or 2.0 in MATH 326 and 2.0 in MATH 328 and 2.0 in either MATH 308 or 2.0 in MATH 318. Offered: W.

MATH 443 Topics in Topology and Geometry (3) NW

Content selected from such topics as homotopy theory, topological surfaces, advanced differential geometry, projective geometry, hyperbolic geometry, spherical geometry, and combinatorial geometry. Offered: Sp.

MATH 444 Geometry for Teachers (3) NW

Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models. Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Cannot be used as elective credit for either BS program in mathematics. Prerequisite: 2.0 in MATH 126; either 2.0 in MATH 136, 2.0 in MATH 205, 2.0 in MATH 308, or 2.0 in MATH 318. Offered: AS.

MATH 445 Geometry for Teachers (3) NW

Concepts of geometry from multiple approaches; discovery, formal and informal reasoning, transformations, coordinates, exploration using computers and models. Topics selected from Euclidean plane and space geometry, spherical geometry, non-Euclidean geometries, fractal geometry. Designed for teaching majors. Cannot be used as elective credit for either BS program in mathematics. Prerequisite: 2.0 in MATH 444. Offered: WS.

MATH 461 Combinatorial Theory (3) NW

Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: either 2.0 in MATH 308 or 2.0 in MATH 318.

MATH 462 Combinatorial Theory (3) NW

Selected topics from among: block designs and finite geometries, coding theory, generating functions and other enumeration methods, graph theory, matroid theory, combinatorial algorithms, applications of combinatorics. Prerequisite: 2.0 in MATH 461.

MATH 464 Numerical Analysis I (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: either 2.0 in MATH 136, 2.0 in MATH 308 and 2.0 in MATH 327, 2.0 in MATH 318 and 2.0 in MATH 327, or 2.0 in MATH 335. Offered: A.

MATH 465 Numerical Analysis II (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: 2.0 in MATH 464. Offered: W.

MATH 466 Numerical Analysis III (3) NW Basic principles of numerical analysis, classical interpolation and approximation formulas, finite differences and difference equations. Numerical methods in algebra, systems of linear equations, matrix inversion, successive approximations, iterative and relaxation methods. Numerical differentiation and integration. Solution of differential equations and systems of such equations. Prerequisite: either 2.0 in MATH 307 or 2.0 in MATH 136; 2.0 in MATH 465. Offered: Sp.

MATH 480 Special Topics in Undergraduate Mathematics (3, max. 12) Advanced topics in various areas of undergraduate mathematics.

MATH 487 Advanced Mathematics Computer Laboratory (1-2, max. 6) NW Laboratory activities in the use of computing as a tool for doing mathematics, to be taken jointly with a designated section of a 400-level mathematics course. Credit/no credit only.

MATH 492 Stochastic Calculus for Option Pricing (3) NW Introductory stochastic calculus mathematical foundation for pricing options and derivatives. Basic stochastic analysis tools, including stochastic integrals, stochastic differential equations, Ito's formula, theorems of Girsanov and Feynman-Kac, Black-Scholes option pricing, American and exotic options, bond options. Prerequisite: MATH STAT 394-5. Offered: jointly with STAT 492; W.

MATH 496 Honors Senior Thesis (1-5) NW Problem seminar for honors students. Cannot be repeated for credit. Offered: AW/Sp.

MATH 497 Special Topics in Mathematics for Teachers (2-9, max. 9) NW Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered: jointly with EDC&I 478.

MATH 498 Special Topics in Mathematics (1-5, max. 15) Reading and lecture course intended

for special needs of advanced students. Offered: AW/Sp.

MATH 499 Undergraduate Research (8) Summer research opportunity for undergraduates. Credit/no credit only. Offered: S.

MATH 500 Mathematical Communication for Graduates (2) Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with AMATH 580/STAT 500.

MATH 501 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 502 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 503 Special Topics in Teaching and Learning Mathematics (2-3, max. 15) Selected Topics dealing with issues in the teaching and learning of mathematics.

MATH 504 Modern Algebra (5) First quarter of a three-quarter sequence covering group theory; field theory and Galois theory; commutative rings and modules, linear algebra, theory of forms; representation theory, associative rings and modules; commutative algebra and elementary algebraic geometry. Prerequisite: MATH 404 or equivalent.

MATH 505 Modern Algebra (5) Continuation of MATH 504. Prerequisite: MATH 504.

MATH 506 Modern Algebra (5) Continuation of MATH 505. Prerequisite: MATH 505.

MATH 507 Algebraic Geometry (3) First quarter of a two-quarter sequence covering the basic theory of affine and projective varieties, rings of functions, the Hilbert Nullstellensatz, localization, and dimension; the theory of algebraic curves, divisors, cohomology, genus, and the Riemann-Roch theorem; and related topics. Prerequisite: MATH 506.

MATH 508 Algebraic Geometry (3) Continuation of MATH 507. Prerequisite: MATH 507.

MATH 509 Theory of Optimal Control (3) Trajectories from ordinary differential equations with control variables. Controllability, optimality, maximum principle. Relaxation and existence of solutions. Techniques of nonsmooth analysis. Prerequisite: real analysis on the level of MATH 426; background in optimization corresponding to MATH 515. Offered: jointly with AMATH 509; even years.

MATH 510 Seminar in Algebra (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 514 Networks and Combinatorial Optimization (3) Networks and directed graphs. Paths and trees. Feasible and optimal flows and potentials. Transportation problems, matching and assignment problems. Algorithms and applications. Prerequisite: MATH 308 or AMATH 352 and MATH 324. Offered: jointly with AMATH 514.

MATH 515 Fundamentals of Optimization (5) Maximization and minimization of functions of

finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with IND E 515/AMATH 515.

MATH 516 Numerical Optimization (3) Methods of solving optimization problems in finitely many variables, with or without constraints. Steepest descent, quasi-Newton methods. Quadratic programming and complementarity. Exact penalty methods, multiplier methods. Sequential quadratic programming. Cutting planes and nonsmooth optimization. Prerequisite: MATH 515. Offered: jointly with AMATH 516.

MATH 517 Optimization Under Uncertainty (3) Sequential optimization problems involving random variables. Dynamic programming, stochastic programming. Control of uncertain dynamic systems in finite, discrete time. Risk, feedback, adaptivity. Problems with imperfect state information. Applications such as to optimal stopping, inventory control, resource management. Prerequisite: MATH 308, MATH 324 and an introduction to basic concepts of probability, such as MATH 390 or MATH 394, MATH 395. Offered: jointly with AMATH 517.

MATH 521 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 521.

MATH 522 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 522.

MATH 523 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers, Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with STAT 523.

MATH 524 Real Analysis (5) First quarter of a three-quarter sequence covering the theory of measure and integration, point set topology, Banach spaces, L_p spaces, applications to the theory of functions of one and several real variables. Additional topics to be chosen by instructor. Prerequisite: MATH 426 or equivalent.

MATH 525 Real Analysis (5) Continuation of MATH 524. Prerequisite: MATH 524.

MATH 526 Real Analysis (5) Continuation of MATH 525. Prerequisite: MATH 525.

MATH 527 Functional Analysis (3) First quarter of a three-quarter sequence. Review of Banach, Hilbert, and L_p spaces; locally convex spaces (duality and separation theory, distributions, and function spaces); operators on locally convex spaces (adjoints, closed graph/open mapping and Banach-Steinhaus theorems); Banach algebras (spectral theory, elementary applications); spectral theorem for Hilbert space operators. Additional topics chosen by instructor.

A working knowledge of real variables, general topology, and complex variables is assumed.

MATH 528 Functional Analysis (3) Continuation of MATH 527. Prerequisite: MATH 527.

MATH 529 Functional Analysis (3) Continuation of MATH 528. Prerequisite: MATH 528.

MATH 530 Seminar in Analysis (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 534 Complex Analysis (5) First quarter of a three-quarter sequence covering complex numbers, analytic functions, contour integration, power series, analytic continuation, sequences of analytic functions, conformal mapping of simply connected regions, and related topics. Prerequisite: MATH 426.

MATH 535 Complex Analysis (5) Continuation of MATH 534. Prerequisite: MATH 534.

MATH 536 Complex Analysis (5) Continuation of MATH 535. Prerequisite: MATH 535.

MATH 537 Several Complex Variables (3) First quarter of a three-quarter sequence covering Weierstrass preparation theorem and its immediate consequences, analytic continuation, domains of holomorphy, pseudoconvexity, Cartan-Oka theory of coherence, embedding theorems; the CR equations, CR manifolds, connections with algebraic geometry. Prerequisite: MATH 536.

MATH 538 Several Complex Variables (3) Continuation of MATH 537. Prerequisite: MATH 537.

MATH 539 Several Complex Variables (3) Continuation of MATH 538. Prerequisite: MATH 538.

MATH 541 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 542 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 543 Special Topics in Applied Mathematics (2-3, max. 15) Such topics as mathematical quantum theory, fluid mechanics, optimization and operations research, and control theory.

MATH 544 Topology and Geometry of Manifolds (5) First quarter of a three-quarter sequence covering general topology, the fundamental group, covering spaces, topological and differentiable manifolds, vector fields, flows, the Frobenius theorem, Lie groups, homogeneous spaces, tensor fields, differential forms, Stokes's theorem, deRham cohomology. Prerequisite: MATH 404 and MATH 426 or equivalent.

MATH 545 Topology and Geometry of Manifolds (5) Continuation of MATH 544. Prerequisite: MATH 544.

MATH 546 Topology and Geometry of Manifolds (5) Continuation of MATH 545. Prerequisite: MATH 545.

MATH 547 Geometric Structures (3, max. 9) First quarter of a three-quarter sequence covering differential-geometric structures on manifolds, Riemannian metrics, geodesics, covariant differentiation, curvature, Jacobi fields, Gauss-Bonnet theorem. Additional topics to be chosen by the instructor, such as connections in vector bundles and principal bundles, symplectic geometry, Riemannian comparison theorems, symmetric spaces, symplectic geometry, complex manifolds, Hodge theory. Prerequisite: MATH 546.

MATH 548 Geometric Structures (3, max. 9) Continuation of MATH 547. Prerequisite: MATH 547.

MATH 549 Geometric Structures (3, max. 9) Continuation of MATH 548. Prerequisite: MATH 548.

MATH 550 Seminar in Geometry (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 554 Linear Analysis (5) First quarter of a three-quarter sequence covering advanced linear algebra and matrix analysis, ordinary differential equations (existence and uniqueness theory, linear systems, numerical approximations), Fourier analysis, introductions to functional analysis and partial differential equations, distribution theory. Prerequisite: MATH 426 and familiarity with complex analysis at the level of 427 (the latter may be obtained concurrently).

MATH 555 Linear Analysis (5) Continuation of MATH 554. Prerequisite: MATH 554.

MATH 556 Linear Analysis (5) Continuation of MATH 555. Prerequisite: MATH 555.

MATH 557 Introduction to Partial Differential Equations (3) First quarter of a three-quarter sequence. Review of the theory of distributions and the Fourier transform. Detailed study of main linear equations: wave equation, Laplace's equation, and the heat equation. Sobolev spaces and regularity of solutions of elliptic equations. Theory of pseudodifferential operators. Initial value problem for hyperbolic equations and methods of geometrical optics. Fourier integral operators. The Dirichlet problem and eigenfunction expansions for elliptic equations. Prerequisite: MATH 556.

MATH 558 Introduction to Partial Differential Equations (3) Continuation of MATH 557. Prerequisite: MATH 557.

MATH 559 Introduction to Partial Differential Equations (3) Continuation of MATH 558. Prerequisite: MATH 558.

MATH 564 Algebraic Topology (3) First quarter of a three-quarter sequence covering classical and modern approaches; complexes and their homology theory; applications; fixed points, products and Poincaré duality; axiomatic approach. Prerequisite: MATH 506 and MATH 544, or equivalent.

MATH 565 Algebraic Topology (3) Continuation of MATH 564. Prerequisite: MATH 564.

MATH 566 Algebraic Topology (3) Continuation of MATH 565. Prerequisite: MATH 565.

MATH 570 Seminar in Topology (2-5, max. 5) Credit/no credit only. Prerequisite: permission of graduate program coordinator.

MATH 574 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 575 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 576 Fundamental Concepts of Analysis (3) *Hoffman, Toro* Sets, real numbers, topology of metric spaces, normed linear spaces, multivariable calculus from an advanced viewpoint. Introduction to Lebesgue measure and integration. Intended for students in Biostatistics and related fields; does not fulfill requirements for degrees in mathematics.

MATH 577 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 578 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 579 Lie Groups and Lie Algebras (3, max. 9) Topics chosen from: root systems and reflection groups; the structure, classification, and representation theory of complex semisimple Lie algebras, compact Lie groups, or semisimple Lie groups; algebraic groups; enveloping algebras; infinite-dimensional representation theory of Lie groups and Lie algebras; harmonic analysis on Lie groups. Prerequisite: MATH 506; MATH 526 or MATH 546.

MATH 580 Current Topics in Mathematics (2, max. 12) Discussion of current research topics in mathematics, with emphasis on current departmental research projects and interests. Offered: AWP.

MATH 581 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWP.

MATH 582 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWP.

MATH 583 Special Topics in Mathematics (*, max. 36) Advanced topics in various areas of mathematics. Offered: AWP.

MATH 584 Applied Linear Algebra and Introductory Numerical Analysis (5) Numerical methods for solving linear systems of equations,

linear least squares problems, matrix eigen value problems, nonlinear systems of equations, interpolation, quadrature, and initial value ordinary differential equations. Offered: jointly with AMATH 584. A.

MATH 585 Numerical Analysis of Boundary Value Problems (5) Numerical methods for steady-state differential equations. Two-point boundary value problems and elliptic equations. Iterative methods for sparse symmetric and non-symmetric linear systems: conjugate-gradients, preconditioners. Prerequisite: AMATH 584/MATH 584 which may be taken concurrently. Offered: jointly with AMATH 585; W.

MATH 586 Numerical Analysis of Time Dependent Problems (5) Numerical methods for time-dependent differential equations, including explicit and implicit methods for hyperbolic and parabolic equations. Stability, accuracy, and convergence theory. Spectral and pseudospectral methods. Prerequisite: AMATH 581 or AMATH 584. Offered: jointly with AMATH 586/ATM S 581; Sp.

MATH 590 Seminar in Probability (2-5, max. 5) Credit/no credit only. Prerequisite: permission of instructor.

MATH 594 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing, such as iterative methods, eigenvalue computations, approximation theory, finite element methods, inverse problems, nonlinear conservation laws, computational fluid dynamics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 594.

MATH 595 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, AMATH 585, AMATH 586, or equivalent. Offered: jointly with AMATH 595.

MATH 596 Special Topics in Numerical Analysis (2-3, max. 15) Various advanced topics in numerical analysis and scientific computing. See the description for 594 for sample topics. Prerequisite: AMATH 584, 585, 586, or equivalent. Offered: jointly with AMATH 596.

MATH 597 Seminar on Teaching Math (1, max. 3) Issues in the teaching and learning of college mathematics, such as discovering and working with student background and expectations, increasing student engagement with course material, and evaluating student achievement. For graduate students who are, or soon will be, teaching mathematics courses on their own. Credit/no credit only.

MATH 598 Seminar on Technology (1, max. 3) Explores the use of computer technology in teaching and research in mathematics. Develops the basic skills required for using computer mathematics software.

MATH 600 Independent Study or Research (*) .

MATH 700 Master's Thesis (*) .

MATH 800 Doctoral Dissertation (*) .

Music

Music

MUSIC 113 Pre-Core Ear Training (0/1, max. 1) VLPA Pre-core course in musicianship. Offered: ASp.

MUSIC 116 Elementary Music Theory (2) VLPA For nonmusic majors. For people with no hands-on music experience. Rudiments of music; notation of time, small pitch structures (e.g., some scales, chords, rhythmic patterns), some analysis. Recommended: some music training including ability to read music.

MUSIC 117 Elementary Music Theory (2) VLPA For nonmusic majors. For students who can read music, having some performance experience. Prerequisite: MUSIC 116.

MUSIC 118 Elementary Music Theory (2) VLPA For nonmusic majors. For students who read music, have some performance experience, are familiar with scales, chords, intervals. Includes analysis composition in various styles. Prerequisite: MUSIC 117.

MUSIC 119 Introduction to Music Theory and Musicianship (3) VLPA Basic elements of music theory: introduction to acoustics, major and minor scales, triads and seventh chords, keys, four-part writing, functional harmony, modes, simple forms, and jazz notation. Offered: A.

MUSIC 120 Survey of Music (5) VLPA Studies in listening, with emphasis on the changing components of Western art music. Illustrated lectures, laboratory section meetings, and presentations by guest artists.

MUSIC 121 The Orchestra (2) VLPA Development of the orchestra and its literature.

MUSIC 122 The Opera (2) VLPA An introduction to opera through selected masterworks, from Monteverdi to the present. Primarily for nonmajors.

MUSIC 160 Anglo-American Folk Music (5) VLPA Genres and styles from earliest roots to the present; Anglo-American ballads, dance music, French and other European immigrant groups.

MUSIC 161 American Musical Theater (5) VLPA Historical and stylistic study of the development of the American musical theater. European roots in opera and operetta. Contributions from jazz and popular music. Selected musicals studied.

MUSIC 162 American Popular Song (5) VLPA Historical, social, and stylistic study of popular idioms from the late nineteenth century to the present. Most attention to contemporary idioms (rock, country-western, soul, hip-hop). Various facets of the industry examined to learn how they influence taste and musical style.

MUSIC 185 The Concert Season (2) VLPA Performances from the School of Music concert season, supplemented by lecture topics related to concert repertoire. Analysis of applicable musical topics appropriate for enhanced appreciation of historical and cultural contexts of works performed. Attendance at ten concerts required.

MUSIC 191 Composition (3, max. 9) VLPA One-hour private instruction and one-hour laboratory session each week. Intended to develop skill in creative musical expression. For composition majors only.

MUSIC 200 Music, Child, and Family (3) VLPA Campbell Study of music in childhood as part of socialization and enculturation of the child within family and community. Emphasis given to songs and music listening experiences provided by parents to nurture the child's musical, social, and intellectual development from infancy through middle childhood. For nonmajors.

MUSIC 201 First-Year Theory I (3) VLPA Introduction to tonal harmony and counterpoint; triadic progressions in root position; first and second species counterpoint; analysis of simple works. Prerequisite: 2.0 in MUSIC 119; recommended: concurrent registration in MUSIC 204. Offered: W.

MUSIC 202 First-Year Theory II (3) VLPA Continued instruction in tonal harmony and counterpoint; triadic progressions with inversions; third and fourth species counterpoint; further analysis of basic forms. Prerequisite: 2.0 in MUSIC 201; recommended: concurrent registration in MUSIC 205. Offered: Sp.

MUSIC 203 First-Year Theory III (3) VLPA Further introduction in tonal harmony and counterpoint; seventh chords; modulations to closely related keys; secondary dominants; introduction to chromaticism; emphasis on analysis and writing of four-part chorales in early 18th century style. Prerequisite: 2.0 in MUSIC 202; recommended: concurrent registration in MUSIC 206. Offered: A.

MUSIC 204 First-Year Ear Training I (0/1, max. 1) VLPA Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 113; corequisite: MUSIC 201. Offered: W.

MUSIC 205 First-Year Ear Training II (0/1, max. 1) VLPA Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 204; corequisite: MUSIC 202. Offered: Sp.

MUSIC 206 First-Year Ear Training III (0/1, max. 1) VLPA Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 205; corequisite: MUSIC 203. Offered: ASp.

MUSIC 216 Introductory Composition (2) VLPA For students not majoring in composition. Prerequisite: MUSIC 202.

MUSIC 217 Introductory Composition (2) VLPA For students not majoring in composition. Prerequisite: MUSIC 216.

MUSIC 218 Introductory Composition (2) VLPA For students not majoring in composition. Prerequisite: MUSIC 217.

MUSIC 240 Reed-Making Techniques (1, max. 6) VLPA Applies basic reed-making principles and techniques. Individualized instruction allows students of all levels to take the course simultaneously.

MUSIC 250 World Music (3) I&S/VLPA Introduction to world musical traditions, including both sound and socio-cultural dimensions of music. Topics include instruments, rhythm, melody, form, composition, improvisation, music in the family and community, politics, economy, religion, and case studies of major world musical traditions. Prerequisite: MUSIC 201; MUSIC 204.

MUSIC 270 World Popular Music (5) I&S/VLPA

A global survey of popular music, including Latin America, Africa, Eastern Europe, the Middle East, Asia, and the Pacific. Emphasis on students' ability to recognize styles and to analyze the social and historical processes that have shaped them.

MUSIC 291 Composition (3, max. 9) VLPA

One-hour private instruction and one-hour laboratory session per week. Prerequisite: MUSIC 191.

MUSIC 300 Fundamentals of Music Technology (3) VLPA

Introduction to the principles of music technology. Exploration of different categories of music software, in terms of their functionality as well as the fundamental basis of these theories. Prerequisite: MUSIC 203 and MUSIC 206.

MUSIC 301 Second-Year Theory (3) VLPA

Further study of modulation and chromatic harmony; analysis of 18th- and 19th-century short forms; technical exercises; model composition. Prerequisite: 2.0 in MUSIC 203; 2.0 in MUSIC 206; corequisite: MUSIC 304; recommended: concurrent registration in MUSIC 304. Offered: W.

MUSIC 302 Second-Year Theory (3) VLPA

More advanced study in mid- to late 19th-century chromaticism and compositional style; analysis of representative works; technical exercises; model composition. Prerequisite: 2.0 in MUSIC 301; 2.0 in MUSIC 304; corequisite: MUSIC 305. Offered: Sp.

MUSIC 303 Second-Year Theory (3) VLPA

Core theory sequence for majors. Introduction to the theory and analysis of 20th-century music. Prerequisite: 2.0 in MUSIC 302; 2.0 in MUSIC 305; corequisite: MUSIC 306. Offered: A.

MUSIC 304 Second-Year Ear-Training I (0/1, max. 1) VLPA

Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 203; 2.0 in MUSIC 206; corequisite: MUSIC 301. Offered: W.

MUSIC 305 Second-Year Ear-Training II (0/1, max. 1) VLPA

Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 301; 2.0 in MUSIC 304; corequisite: MUSIC 302. Offered: Sp.

MUSIC 306 Second-Year Ear-Training III (0/1, max. 1) VLPA

Core ear-training sequence for majors. Prerequisite: 2.0 in MUSIC 302; 2.0 in MUSIC 305; corequisite: MUSIC 303. Offered: A.

MUSIC 307 Diction for Singers (2) VLPA

Application of basic rules of diction, enunciation, and articulation in Italian. Materials include texts from the basic vocal repertoire. Primarily for the voice majors at freshman and sophomore levels; nonmajors on a space-available basis.

MUSIC 308 Diction for Singers (2) VLPA

Application of basic rules of diction, enunciation, and articulation in French. Materials include texts from the basic vocal repertoire. Primarily for the voice majors at freshman and sophomore levels; nonmajors on a space-available basis.

MUSIC 309 Diction for Singers (2) VLPA

Application of basic rules of diction, enunciation, and articulation in German. Materials include texts from the basic vocal repertoire. Primarily for the voice majors at freshman and sophomore levels; nonmajors on a space-available basis.

MUSIC 316 Music Cultures of the World (5) I&S/VLPA

Near East, Central Asia, Far East, South and southeast Asia, Indonesia, and the Philippines. Content varies.

MUSIC 317 Music Cultures of the World (5) I&S/VLPA

Music of Africa, Americas, and Oceania. Content varies.

MUSIC 318 Music Cultures of the World (5) I&S/VLPA

Folk and popular music in western and eastern Europe and the Americas. Content varies.

MUSIC 319 Afro-American Music (5) I&S/VLPA

Centers on Black music in the United States, but also clarifies the relationship of this music to the musics of other Afro-American cultures as well as to their African roots.

MUSIC 326 Repertoire (2) VLPA

For music majors.

MUSIC 327 Repertoire (2) VLPA

For music majors.

MUSIC 328 Repertoire (2) VLPA

For music majors.

MUSIC 331 History of Jazz (5) VLPA

Extensive overview of important musicians, composers, arrangers, and stylistic periods of jazz history from emergence of the first jazz bands at the turn of the 20th century through post-modern bebop era of the 1990s.

MUSIC 332 Music in European Society: Antiquity to 1700 (5) I&S/VLPA

Music and its relationship to aspects of European culture and society—philosophy, politics, social conditions, and the visual arts from antiquity to 1700.

MUSIC 333 Music in Western Culture (5) I&S/VLPA

Music in Europe and North America, drawn from classical, popular, jazz, opera, and musical theatre traditions. Emphasis on the relationship between musical works and their social, philosophical, political, and other contexts.

MUSIC 334 Band Arranging (2) VLPA

Prerequisite: MUSIC 303.

MUSIC 336 Jazz Arranging (2) VLPA

Writing in jazz style for various instrumental combinations. To be able to arrange for modern jazz orchestra. Prerequisite: MUSIC 303.

MUSIC 344 Psychology of Music: Cognition (5) I&S/VLPA

Critical examination of questions, designs, and conclusions of previous research in a variety of areas related to music cognition including music perception, music performance, musical development, musical affect, musical preference, social psychology, and neuroscience.

MUSIC 350 Choral Conducting (1) VLPA

Kaplan Overview of choral conducting patterns. Score, voice warm-up, and intonation. Tempo fluctuation, left hand, diction, discipline. Designed for music and music education majors. Prerequisite: MUSIC 302; corequisite: MUSEN 307.

MUSIC 351 Choral Conducting (1) VLPA

Kaplan Overview of choral conducting patterns. Score, voice warm-up, and intonation. Tempo fluctuation, left hand, diction, discipline. Designed for music and music education majors. Prerequisite: MUSIC 350; corequisite: MUSEN 307.

MUSIC 352 Choral Conducting (1) VLPA

Kaplan Overview of choral conducting patterns. Score, voice warm-up, and intonation. Tempo fluctuation, left hand, diction, discipline. Designed for music and music education majors. Prerequisite: MUSIC 351; corequisite: MUSEN 307.

MUSIC 366 Cylinders to Platters—A Survey of Recorded Music Since 1888 (3) VLPA

Music as reflected through the influences of the recording industry and the development of related technologies. Examines social and artistic impacts that the recording age has brought to American and European musical cultures. Recommended: MUSIC 120; MUSIC 162.

MUSIC 367 Beginning Jazz Improvisation I (1) VLPA

Beginning jazz improvisation techniques used in the performance of basic jazz styles such as the blues. Primarily for music majors. Prerequisite: MUSIC 302.

MUSIC 368 Beginning Jazz Improvisation II (1) VLPA

Beginning jazz improvisation techniques used in the performance of basic jazz styles such as the blues. Primarily for music majors. Prerequisite: MUSIC 367.

MUSIC 369 Beginning Jazz Improvisation III (1) VLPA

Beginning jazz improvisation techniques used in the performance of basic jazz styles such as the blues. Primarily for music majors. Prerequisite: MUSIC 368.

MUSIC 379 Junior Recital (1) VLPA

For participants in the Bachelor of Music degree program only.

MUSIC 380 Instrumental Conducting (1) VLPA

Salzman Acquaints the beginning conductor with beat patterns and their expressive modifications, basic rehearsal techniques and score study. Prerequisite: either MUSIC 212 or MUSIC 302.

MUSIC 381 Instrumental Conducting (1) VLPA

Salzman Acquaints the beginning conductor with beat patterns and their expressive modifications, basic rehearsal techniques and score study. Prerequisite: MUSIC 380.

MUSIC 382 Instrumental Conducting (1) VLPA

Salzman Acquaints the beginning conductor with beat patterns and their expressive modifications, basic rehearsal techniques and score study. Prerequisite: MUSIC 381.

MUSIC 384 Ideas In Music (5) I&S/VLPA

Taricani Examines selected sources and compositions of music from the Western tradition (from the tenth through the twentieth centuries), in relation to the intellectual background of the periods and countries that produced them. Musical studies accompanied by assigned readings in philosophical, religious, literary, and artistic texts in addition to the primary readings in musical history.

MUSIC 388 Jazz Pedagogy (2) VLPA

Stylistic and esthetic developments in the performance of jazz. Key musical ingredients in the evolution of jazz as an art form and the skills commensurate with teaching these. Designed for music majors.

MUSIC 390 Special Topics in Music (3, max. 9) (5) VLPA

Starr Topics vary.

MUSIC 391 Composition (3, max. 9) VLPA

One-hour private instruction and one-hour laboratory session each week. Prerequisite: MUSIC 291.

MUSIC 400 Computer Applications to Music (3, max. 9) VLPA Music workstation applications using microcomputers, music synthesizers, and analog-to-digital converters: music editing and score production, transcription, waveform and spectral analysis, and introduction to programming.

MUSIC 402 Digital Sound Processing (5) VLPA Introduction to digital sound processing techniques. Includes sampling techniques and time-domain transformation of samples sound; sample-rate conversion; sound granulation and time stretching; delay lines; introduction to digital filtering; FIR and IIR filters; digital effects; reverberation; virtual-room acoustics and dynamic sound location. Prerequisite: DXARTS 461/MUSIC 401. Offered: jointly with DXARTS 462; W.

MUSIC 403 Advanced Digital Sound Synthesis and Processing (5) VLPA Advanced sound processing and synthesis techniques. Includes sound time warping; analysis-synthesis techniques; linear predictive coding; the phase vocoder; frequency-domain sound transformations; introduction to physical modeling. Prerequisite: DXARTS 462/MUSIC 402. Offered: jointly with DXARTS 463; S.

MUSIC 405 Liturgics and Hymnology: Practical Applications I (2) VLPA *Butler* Prepares organ majors and other advanced organ students to play hymns in a manner that inspires congregational singing. Includes a study of hymnology as well as instruction on the realization of anthem accompaniments and piano scores at the organ. Prerequisite: MUSIC 302; MUSIC 305; MUHST 212. Offered: A.

MUSIC 406 Liturgics and Hymnology: Practical Applications II (2) VLPA *Butler* Survey of church choir repertoire with emphasis on the smaller choir, choir organization and rehearsal techniques, choral conductor's preparation, a brief study of choral styles and editions, and choral arranging for the church choir. Prerequisite: either MUSIC 303, MUSIC 306, and MUHST 210, or MUSIC 405. Offered: W.

MUSIC 407 Liturgics and Hymnology: Practical Applications III (2) VLPA *Butler* History of Psalm singing, traditional and contemporary liturgics, plainchant, liturgical use of handbells, "contemporary" repertoire for the church, orchestral instruments and their use in worship (arranging for amateur players, basics of string bowing and editing, organizing instrumental ensembles), youth choir organization. Prerequisite: either MUSIC 303, MUSIC 306, and MUHST 210, or MUSIC 406. Offered: Sp.

MUSIC 410 ElectroAcoustic Music: History and Analysis (3) VLPA *Thome* Examines the music of major electro-acoustic composers. Emphasis on the relationship between technological resources and compositional advances. Addresses issues raised by the diversity of approaches to musical composition; relates particular creative contributions to the historical, cultural, and technological contexts in which they originated. Prerequisite: MUSIC 303; MUSIC 306; MUHST 210. Offered: Sp.

MUSIC 418 Baroque Ornamentation and Improvisation (3) VLPA *Terry* The study of ornamentation and improvisation for keyboard, woodwinds, voice, and strings of selected German, Italian, French, and English repertoire from 1600 to 1800.

MUSIC 420 Organ Improvisation and Service Playing I (2) VLPA Prepares students to improvise, especially for the church/synagogue service. Includes a brief study of hymnology, hymn elaboration, altered harmonizations, improvisation based on existing hymn tunes, interludes, chorale preludes, ornamented chorales. Prerequisite: MUSIC 303; MUSIC 306. Offered: A.

MUSIC 421 Organ Improvisation and Service Playing II (2) VLPA Continuation of MUSIC 420. Includes brief review of figured bass and functional harmony, free improvisation in simple antecedent/consequent ABA forms and more complex forms (rondo, theme, and variation), improvising partitas, interludes, improvisations based on plainchant. A survey of important improvisation texts. Prerequisite: MUSIC 420. Offered: W.

MUSIC 422 Organ Improvisation and Service Playing III (2) VLPA Continuation of MUSIC 421. Advanced improvisation: baroque improvisation techniques, fuguetas, baroque praeludias and fantasias, canons, toccatas, duos, trios, and simple fugues. Prerequisite: MUSIC 421. Offered: Sp.

MUSIC 426 Advanced Jazz Arranging (2) VLPA *Brockman* Advanced arranging techniques for jazz ensembles of various sizes, exploring methods employed by Duke Ellington, Gil Evans, and others. Assignments include one original arrangement each for small-combo and full-jazz ensemble. Prerequisite: MUSIC 336. Offered: Sp.

MUSIC 427 Music of Africa (3) I&S/VLPA Music cultures of Africa. Traditional styles and more recent developments. Open to all students with an interest in the area. Prerequisite: MUSIC 317.

MUSIC 428 Music of North India (3) I&S/VLPA Classical music of North India, the Hindustani tradition with emphasis on the Dhrupad and Khyal styles. Recommended: ethnomusicology or South Asian studies background.

MUSIC 429 String Orchestral Repertoire (2, max. 18) VLPA *Lieberman Patterson, Saks, Watras* Intended for undergraduate BA/BM and BM music majors. Offered: biannually; AWSp.

MUSIC 430 Organology (3) VLPA Systematic study of musical instruments, involving the history, acoustical phenomena, and physical topologies of instruments from around the world, with emphasis on non-Western music.

MUSIC 433 Music of Latin America (3) I&S/VLPA The music of the Spanish-, French-, and Portuguese-speaking New World countries.

MUSIC 434 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 435 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 436 Pedagogy (2) VLPA Principles of effective studio teaching; survey and evaluation of teaching materials.

MUSIC 438 Problems in Contemporary Music Performance (3, max. 9) VLPA *Kappy* An active course examining and solving problems relevant to the successful performance of twentieth-century music. Preparation for complex rhythms,

odd groupings, new notation, and extended performing techniques.

MUSIC 439 Music of Indonesia and the Philippines (3) I&S/VLPA Includes the traditions of Sumatra, Sunda, Java, Bali, Sunda Islands, and the Philippines. Open to students in music and to students with an interest in the area.

MUSIC 444 Music of the Near East (3) I&S/VLPA Classical and folk musical traditions of Iran, Turkey, and the Arab world. Prerequisite: MUSIC 316.

MUSIC 446 Music in American Cultures (3) I&S/VLPA Compares musical history and experience of selected American cultures that have fed into the American musical mainstream or had significant popularity on its periphery. Case studies may include African Americans, Latino/a Americans, Jewish Americans, Asian Americans, or European Americans. Considerations of social identity as well as musical styles. Offered: jointly with AES 446.

MUSIC 447 Music of Southern India (3) I&S/VLPA Classical music of South India, the Karnatic tradition, with emphasis on the concert repertoire. Recommended: ethnomusicology or South Asian studies background.

MUSIC 448 Music of China (3) I&S/VLPA Confucian philosophies that relate to music, theory, scale systems, cosmology. Development of instrumental styles, vocal and dramatic regional forms from early historical periods to the present; recommended: background in either ethnomusicology or East Asian Studies. Recommended: ethnomusicology or East Asian studies background.

MUSIC 449 Advanced Piano Repertoire (2, max. 6) VLPA *McCabe, Michaelian, Sheppard* For piano majors who wish an in-depth survey of major areas of the piano repertoire. Prerequisite: MUSIC 328. Offered: AWSp.

MUSIC 450 Percussion Education Institute (2) VLPA *Collier, Crusoe* Intensive four-week institute focusing on techniques in percussion, timpani, and mallet performance. Intended for music educators with little or no percussion experience desiring additional training to enhance their careers as music teachers. Includes private instruction, master classes, and percussion ensemble participation. Prerequisite: MUSAP 217.

MUSIC 451 Summer Jazz Institute (1) VLPA *Brockman, Collier, Seales* Intensive one-week institute designed for the serious jazz student as well as for music educators. Six hours of daily instruction in jazz theory, ear-training, improvisation, arranging, as well as emphasis on rehearsal and performance techniques through sectional workshops and small group "jam sessions."

MUSIC 454 Organ Pedagogy (3) VLPA *Terry* Pedagogical approaches to organ techniques and performance practice, provides opportunity for practical application by means of student teaching.

MUSIC 455 Choral Arranging (3) VLPA Primarily for choral conductors who need to modify, arrange or compose material to suit the capabilities of specific choral groups and performance situations.

MUSIC 458 Organ Repertoire: Middle Ages through Baroque (3) VLPA *Terry* Analysis and

performance practices of organ literature, Middle Ages through baroque period. Development of the organ as musical instrument. Prerequisite: either MUHST 400, MUHST 401, MUHST 402, MUHST 403, MUHST 406, or MUHST 407.

MUSIC 459 Organ Repertoire: Bach to Present (3) VLPA Terry Analysis and performance practices of organ literature, classical period through the twentieth century. Development of the organ as a musical instrument. Prerequisite: either MUHST 408, MUHST 409, MUHST 410, MUHST 411, MUHST 412, MUHST 413, MUHST 414, MUHST 415, MUHST 417, MUHST 418, MUHST 419, MUHST 423, MUHST 424, or MUHST 426.

MUSIC 460 Advanced Vocal Repertoire: Pre-Nineteenth-Century Art Songs (2, max. 6) VLPA Professional preparation of pre-nineteenth-century songs with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 328.

MUSIC 461 Advanced Vocal Repertoire: Nineteenth-Century Art Songs (2, max. 6) VLPA Professional preparation of works from the literature of nineteenth-century German lieder, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 460.

MUSIC 462 Advanced Vocal Repertoire: Twentieth-Century Art Songs (2, max. 6) VLPA Preparation of works from the twentieth-century repertoire of French, German, Italian, Spanish, and English songs, with a view to total artistic-musical realization in performance. Appropriate style, character, balance, phrasing, diction, and projection for vocalists and pianists. Prerequisite: MUSIC 461.

MUSIC 464 Jazz Laboratory (1, max. 9) VLPA Seales Forum for testing new technical skills, improvisational techniques, and jazz compositions and/or arrangements in a formal laboratory setting.

MUSIC 465 Acting for Singers (2, max. 6) VLPA Workshop designed specifically for the singing actor, focusing on character analysis, movement, and audition department skills.

MUSIC 467 Advanced Jazz Improvisation I (1) VLPA Collier, Seales Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 369.

MUSIC 468 Advanced Jazz Improvisation II (1) VLPA Collier, Seales Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 467.

MUSIC 469 Advanced Jazz Improvisation III (1) VLPA Collier, Seales Performance techniques in jazz improvisation for the advanced student. Prerequisite: MUSIC 468.

MUSIC 470 Analysis of Tonal Music: Introduction to Schenker (3) VLPA Bernard, Kopp, Rahn Introduction to the theories of Heinrich Schenker and their subsequent development; analysis of music from the common-practice period (1700-1900), with possible excursions into the twentieth century. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 471 Introduction to Atonal Theory and Analysis (3) VLPA Bernard, Rahn Theory of atonal music, including the "classical" twelve-tone repertoire. Analysis of works by Schoenberg, Berg, Webern, and others. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 472 Analysis of Twentieth Century Music, 1900-1950 (3, max. 6) VLPA Bernard, Durand, Karpen, Kopp, Rahn, Thome Analytical examination of musical works of the first half of the twentieth century in Europe and the United States, with emphasis on music other than that of the second Viennese school. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215.

MUSIC 473 Keyboard Harmony and Transposition (3) VLPA Terry Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: either MUSIC 303 and MUHST 212 or MUSIC 312 and MUHST 215. Offered: alternate years.

MUSIC 474 Keyboard Harmony and Transposition (3) VLPA Terry Keyboard harmonization from the baroque period to present; transposition of vocal and instrumental pieces to different pitch levels. Prerequisite: MUSIC 473. Offered: alternate years.

MUSIC 475 Figured Bass Realization (3) VLPA Terry Various styles of continuo realization for keyboardists, emphasizing Bach cantatas, Haydn symphonies, and Mozart operas. Prerequisite: MUSIC 474. Offered: alternate years.

MUSIC 476 Advanced Vocal Repertoire: Seventeenth and Eighteenth Centuries (2) VLPA Opera repertoire, 1600 to the Bel Canto era (Bellini, Rossini, Donizetti); style, traditions, embellishments in Italian, French, and German arias. Prerequisite: MUSIC 328.

MUSIC 477 Advanced Vocal Repertoire: Nineteenth Century (2) VLPA Opera repertoire, the post Bel Canto era through Verdi, Puccini and verismo, and significant German, French, and Slavic repertoire. Prerequisite: MUSIC 476.

MUSIC 478 Advanced Vocal Repertoire: Twentieth Century (2) VLPA Opera repertoire, twentieth-century opera literature (Barber, Menotti, Bartok, Dvorak); understanding of style, character and overall artistic and musical needs of the present. Prerequisite: MUSIC 477.

MUSIC 479 Senior Recital (1) VLPA .

MUSIC 480 The Anthropology of Music (3) I&S/VLPA Analysis of aspects of anthropological thought influential in ethnomusicology. Critical evaluation of dominant theoretical schools and modes of explanation. e.g., evolutionist, diffusionist, historical particularist, structuralist, functionalist, symbolist, and semiotic, through detailed examination of seminal texts. Offered: jointly with ANTH 430.

MUSIC 481 Choral Repertoire: Sixteenth and Seventeenth Centuries (3) VLPA Sacred and secular choral literature from the Renaissance through the early baroque, covering Europe and England. Various genres and styles of major composers, including performance practice, rehearsals, and conducting.

MUSIC 482 Choral Repertoire: Eighteenth Century (3) VLPA Sacred and secular choral

literature of the baroque, covering mainland Europe and England. Choral works of Bach, his predecessors, and contemporaries. Stylistic analysis and study of performance practice.

MUSIC 483 Choral Repertoire: Nineteenth Century (3) VLPA Sacred and secular choral literature of the nineteenth century, covering mainland Europe and England. Analysis of accompanied and a cappella choral works by major composers with implications for conducting and programming of literature.

MUSIC 484 Choral Repertoire: Twentieth Century (3) VLPA Choral literature of the twentieth century, covering America, England, and mainland Europe. Various genres and styles, including score study and teaching strategies.

MUSIC 487 Tonal Counterpoint (3) VLPA Bernard, Durand, Kopp, Rahn Introduction to tonal counterpoint through exercises in analysis and composition, focusing on 18th-century styles. Study of melody principles of counterpoint in two and three voices, dance forms, inventions, fugue. Prerequisite: either MUSIC 311 or MUSIC 202.

MUSIC 490 Orchestration (3) VLPA Study of the instruments of the orchestra and practical experience in combining them; to enable the student to score for various instrumental combinations. Ideally to be taken before band arranging or jazz arranging, but is not a prerequisite.

MUSIC 491 Composition (3, max. 18) VLPA One-hour private instruction and one-hour laboratory session each week. Prerequisite: MUSIC 391.

MUSIC 492 Opera Direction and Production (4) VLPA Practical experience with problems of the theater.

MUSIC 493 Opera Direction and Production (4) VLPA Practical experience with problems of the theater. Prerequisite: MUSIC 492.

MUSIC 495 Music of Japan (3) I&S/VLPA Survey of major Japanese musical traditions. Open to students in music and East Asian area studies. Prerequisite: MUSIC 316.

MUSIC 498 Senior Thesis (3-, max. 9) VLPA Design and completion of an individual research project and writing of a thesis under supervision of a faculty member. .

MUSIC 499 Undergraduate Research (*, max. 6) .

MUSIC 511 Seminar in Field and Laboratory Methods (3) Methodology of field research in ethnomusicology along with practical experience. Prerequisite: graduate student standing in ethnomusicology or permission of instructor.

MUSIC 520 Music in Higher Education (3) Morrison Philosophical and practical issues surrounding music within the context of higher education. Topics include mission and structure of music programs, development of teaching expertise, teacher/student evaluation, academic freedom, and job opportunities. Appropriate for all graduate music students and does not require background in teaching or education.

MUSIC 523 Seminar in Music and Socialization (3, max. 9) Lundquist The socialization process and music, including the interaction

whereby music culture is learned. Prerequisite: MUSIC 345 or MUSIC 545 or permission of instructor.

MUSIC 526 History of Theory (3) Ancient, medieval, early Renaissance.

MUSIC 527 History of Theory (3) Renaissance, baroque, early classic.

MUSIC 528 History of Theory (3) Classic, romantic, twentieth century.

MUSIC 530 Seminar in Music Cognition (3, max. 9) Study of research literature in cognition and music cognition, particularly as it relates to nonverbal musical experience. Prerequisite: MUSIC 344 or MUSIC 544 or permission of instructor.

MUSIC 531 Proseminar in Ethnomusicology (3) Theoretical and methodological issues in ethnomusicology based on historical and contemporary major writings. Critical evaluations of works with a broad view toward developing ethnomusicological research. Prerequisite: permission of instructor.

MUSIC 532 Opera Direction and Production (4/6, max. 12) Practical experience with problems of the opera theatre.

MUSIC 533 Preceptorial Readings in Ethnomusicology (5) Significant ethnomusicological literature on the music cultures of Asia. Meets with MUSIC 316. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 534 Preceptorial Readings in Ethnomusicology (5) Significant ethnomusicological literature on the music cultures of Africa, the Americas, and Oceania. Meets with MUSIC 317. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 535 Preceptorial Readings in Ethnomusicology (5) Significant ethnomusicological literature on the music cultures of Europe and North America. Meets with MUSIC 318. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 536 Transcription and Analysis (3) Study of the methodological principles of transcription and analysis, together with practical exercises in developing transcription skills. Prerequisite: graduate student standing in ethnomusicology and permission of instructor.

MUSIC 544 Music Perception and Cognition (3, max. 9) Examines the systematic research literature on the cognitive operations involved in musical performance, composition, and listening. Topics include: the mental representation of musical concepts, communication of expressiveness in music, memory for music, processing of tonal and nontonal music; computer models of music cognition; melodic and rhythmic development; composition and improvisation.

MUSIC 551 Practicum in Music Instruction (3, max. 9) Practical application and validation of results of investigation in curriculum, music teaching and learning, performance and theoretical studies. Prerequisite: teaching experience or permission of instructor.

MUSIC 553 Advanced Choral Techniques (2,

max. 18) Practical application of technique and pedagogy related to choral music. Surveys major choral repertoire. Concurrent enrollment in MUSIC 583 required.

MUSIC 559 Master's Recital (3, max. 6) Public performance for students in the Master of Music degree program. Prerequisite: permission of instructor and Master of Music program standing.

MUSIC 570 Seminar in Schenkerian Analysis (3, max. 9) *Bernard, Kopp, Rahn* Advanced work in Schenkerian analysis. Prerequisite: MUSIC 470.

MUSIC 571 Seminar in Serialism (3, max. 9) *Bernard, Kopp, Rahn* Advanced theoretical and analytical work in serialism and other nontonal systems. Prerequisite: MUSIC 471 or equivalent.

MUSIC 572 Advanced Topics in Computer Music (3) *Karpen, Rahn* Topics vary. Offered: AWSpS.

MUSIC 573 Seminar in Tonal Analysis (3, max. 9) Modern theoretical and analytical methods appropriate to study of western music of the eighteenth and nineteenth centuries, conceived independently of or in response to the work of Heinrich Schenker. Prerequisite: MUSIC 470 or permission of instructor.

MUSIC 574 Analysis of Twentieth-Century Music: 1950 — Present (3) *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of major works of second half of twentieth century. Prerequisite: MUSIC 471 and MUSIC 472 or permission of instructor.

MUSIC 575 Seminar in Theory (3, max. 18) *Bernard, Kopp, Rahn* Development and discussion of current student and faculty research in compositional/analytical theory and metatheory.

MUSIC 576 Critical Theory of Music (3, max. 18) Philosophical foundations of the criticism of music, including relevant contemporary thought in the criticism of literature and the other arts.

MUSIC 577 Composers of the Twentieth Century (3, max. 9) *Bernard, Durand, Karpen, Kopp, Rahn, Thome* Analytical examination of the work of a major composer of the twentieth century. Prerequisite: MUSIC 574 or permission of instructor.

MUSIC 580 Advanced Conducting (3, max. 9) *Eros, Salzman* .

MUSIC 581 Advanced Conducting (3, max. 9) *Eros, Salzman* .

MUSIC 582 Advanced Conducting (3, max. 9) *Eros, Salzman* .

MUSIC 583 Advanced Choral Conducting (2, max. 18) *Kaplan* .

MUSIC 590 Keyboard and Doctoral Lecture Recital or Concerto Recital (6, max. 18) Lecture recital or Concerto recital for students in the Doctor of Musical Arts in Piano Performance, in Harpsichord Performance, and in Organ Performance degree programs.

MUSIC 591 Graduate Composition (*, max. 30) *Bernard, Durand, Karpen, Rahn, Thome* .

MUSIC 599 Advanced Selected Topics (1-3, max. 27) Selected readings on current issues

and problems in music. Prerequisite: permission of a supervising music faculty member.

MUSIC 600 Independent Study or Research (*)

MUSIC 700 Master's Thesis (*) .

MUSIC 800 Doctoral Dissertation (*) .

Music Applied

MUSAP 133 Basic Keyboard (2) VLPA Keyboard harmony and simple keyboard pieces. Class instruction. Audition required. Prerequisite: MUSIC 116.

MUSAP 134 Basic Keyboard (2) VLPA Keyboard harmony and simple keyboard pieces. Class instruction. Audition required. Prerequisite: MUSAP 133.

MUSAP 135 Basic Keyboard (2) VLPA Keyboard harmony and simple keyboard pieces. Class instruction. Audition required. Prerequisite: MUSAP 134.

MUSAP 136 Basic Jazz Keyboard (2, max. 6) VLPA *Seales* Basics of jazz and pop chord voicings, reading lead sheets, basic accompanying in various jazz and pop styles. Audition required.

MUSAP 137 Class Instruction: Voice (1) VLPA Basic fundamentals of good singing: breathing, diction, voice focus. Materials include mainly early Italian art songs, some English and French songs. Audition required.

MUSAP 138 Class Instruction: Voice (1) VLPA Basic fundamentals of good singing: breathing, diction, voice focus. Materials include mainly early Italian art songs, some English and French songs. Audition required. Prerequisite: MUSAP 137.

MUSAP 139 Class Instruction: Voice (1) VLPA Basic fundamentals of good singing: breathing, diction, voice focus. Materials include mainly early Italian art songs, some English and French songs. Audition required. Prerequisite: MUSAP 139.

MUSAP 205 String Techniques (2, max. 12) VLPA Designed to prepare music education students to teach beginning and intermediate strings in the public schools.

MUSAP 210 Wind Techniques (2, max. 12) VLPA Designed to prepare music education students to teach beginning and intermediate woodwinds and brass in the public schools.

MUSAP 217 Percussion Techniques (2, max. 4) VLPA *Collier* The study of basic percussion techniques as they apply to music in the public schools. Acquaints the prospective music education major with percussion performance and teaching techniques.

MUSAP 218 Guitar Techniques (2, max. 4) VLPA *Novacek* Includes exercises to develop a good basic technique emphasizing correct position and movement of both hands, basic folk song accompaniments including a variety of strums, finger picking patterns, hammering on and bass runs, reading guitar music, classical pieces, special effects, and access to other styles. Offered: W.

MUSAP 233 Secondary Piano (2) VLPA Focus is on advanced keyboard skills and piano repertoire. Audition required. Prerequisite: MUSAP 135.

MUSAP 234 Secondary Piano (2) VLPA Focus is on advanced keyboard skills and piano repertoire. Audition required. Prerequisite: MUSAP 233.

MUSAP 235 Secondary Piano (2) VLPA Focus is on advanced keyboard skills and piano repertoire. Audition required. Prerequisite: MUSAP 234.

MUSAP 237 Secondary Class Instruction: Voice (2, max. 6) VLPA Continuation of basic fundamentals of good singing: breathing, diction, voice focus and repertoire. Designed for students not yet prepared for private instruction. Audition required. Prerequisite: MUSAP 139.

MUSAP 239 Secondary Piano (2, max. 8) VLPA Intermediate level keyboard repertory. Private instruction. Audition required. Prerequisite: MUSAP 235.

MUSAP 300 Private instruction: Voice (2-3, max. 45) VLPA *Harper, Patrick* Intended for undergraduate non-majors. Audition required.

MUSAP 301 Private Instruction: Piano (2-3, max. 45) VLPA *McCabe, Michaelian, Seales, Sheppard* Intended for undergraduate non-majors. Audition required.

MUSAP 302 Private Instruction: Organ (2-3, max. 45) VLPA *Terry* Intended for undergraduate non-majors. Audition required.

MUSAP 303 Private Instruction: Harpsichord (2-3, max. 45) VLPA *Terry* Intended for undergraduate non-majors. Audition required.

MUSAP 304 Private Instruction: Violin (2-3, max. 45) VLPA Intended for undergraduate non-majors. Audition required.

MUSAP 305 Private Instruction: Violoncello (2-3, max. 45) VLPA *Saks* Intended for undergraduate non-majors. Audition required.

MUSAP 306 Private Instruction: Double Bass (2-3, max. 45) VLPA *Lieberman* Intended for undergraduate non-majors. Audition required.

MUSAP 307 Private Instruction: Flute (2-3, max. 45) VLPA *Skowronek* Intended for undergraduate non-majors. Audition required.

MUSAP 308 Private Instruction: Oboe (2-3, max. 45) VLPA Intended for undergraduate non-majors. Audition required.

MUSAP 309 Private Instruction: Clarinet (2-3, max. 45) VLPA *McColl* Intended for undergraduate non-majors. Audition required.

MUSAP 310 Private Instruction: Bassoon (2-3, max. 45) VLPA *Grossman* Intended for undergraduate non-majors. Audition required.

MUSAP 311 Private Instruction: Saxophone (2-3, max. 45) VLPA *Brockman* Intended for undergraduate non-majors. Audition required.

MUSAP 312 Private Instruction: Horn (2-3, max. 45) VLPA *Kappy* Intended for undergraduate non-majors. Audition required.

MUSAP 313 Private Instruction: Trumpet (2-3, max. 45) VLPA Intended for undergraduate non-majors. Audition required.

MUSAP 314 Private Instruction: Trombone (2-3, max. 45) VLPA *Immel* Intended for undergraduate non-majors. Audition required.

MUSAP 315 Private Instruction: Tuba (2-3, max. 45) VLPA *Phillips* Intended for undergraduate non-majors. Audition required.

MUSAP 316 Private Instruction: Harp (2-3, max. 45) VLPA *Vokolek* Intended for undergraduate non-majors. Audition required.

MUSAP 317 Private Instruction: Percussion (2-3, max. 45) VLPA *Collier, Crusoe* Intended for undergraduate non-majors. Audition required.

MUSAP 318 Private Instruction: Guitar (2-3, max. 45) VLPA *Novacek* Intended for undergraduate non-majors. Audition required.

MUSAP 319 Private Instruction: Viola da Gamba (2-3, max. 45) VLPA *Tindemans* Intended for undergraduate non-majors. Audition required.

MUSAP 320 Private Instruction: Voice (2-3, max. 27) VLPA *Harper, Patrick* Intended for undergraduate majors. Audition required.

MUSAP 321 Private Instruction: Piano (2-3, max. 27) VLPA *McCabe, Michaelian, Seales, Sheppard* Intended for undergraduate majors. Audition required.

MUSAP 322 Private Instruction: Organ (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors. Audition required.

MUSAP 323 Private Instruction: Harpsichord (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors. Audition required.

MUSAP 324 Private Instruction: Violin (2-3, max. 27) VLPA *Patterson* Intended for undergraduate majors. Audition required.

MUSAP 325 Private Instruction: Violoncello (2-3, max. 27) VLPA *Saks* Intended for undergraduate majors. Audition required.

MUSAP 326 Private Instruction: Double Bass (2-3, max. 27) VLPA *Lieberman* Intended for undergraduate majors. Audition required.

MUSAP 327 Private Instruction: Flute (2-3, max. 27) VLPA *Skowronek* Intended for undergraduate majors. Audition required.

MUSAP 328 Private Instruction: Oboe (2-3, max. 27) VLPA Intended for undergraduate majors. Audition required.

MUSAP 329 Private Instruction: Clarinet (2-3, max. 27) VLPA *McColl* Intended for undergraduate majors. Audition required.

MUSAP 330 Private Instruction: Bassoon (2-3, max. 27) VLPA *Grossman* Intended for undergraduate majors. Audition required.

MUSAP 331 Private Instruction: Saxophone (2-3, max. 27) VLPA *Brockman* Intended for undergraduate majors. Audition required.

MUSAP 332 Private Instruction: Horn (2-3, max. 27) VLPA *Kappy* Intended for undergraduate majors. Audition required.

MUSAP 333 Private Instruction: Trumpet (2-3, max. 27) VLPA Intended for undergraduate majors. Audition required.

MUSAP 334 Private Instruction: Trombone (2-3, max. 27) VLPA *Immel* Intended for undergraduate majors. Audition required.

MUSAP 335 Private Instruction: Tuba (2-3, max. 27) VLPA *Phillips* Intended for undergraduate majors. Audition required.

MUSAP 336 Private Instruction: Harp (2-3, max. 27) VLPA *Vokolek* Intended for undergraduate majors. Audition required.

MUSAP 337 Private Instruction: Percussion (2-3, max. 27) VLPA *Collier, Crusoe* Intended for undergraduate majors. Audition required.

MUSAP 338 Private Instruction: Guitar (2-3, max. 27) VLPA *Novacek* Intended for undergraduate majors. Audition required.

MUSAP 339 Private Instruction: Viola da Gamba (2-3, max. 27) VLPA *Tindemans* Intended for undergraduate majors. Audition required.

MUSAP 340 Timpani (2-3, max. 27) VLPA *Crusoe* Intended for undergraduate majors. Audition required.

MUSAP 341 Mallet Percussion (2-3, max. 27) VLPA *Collier* Intended for undergraduate majors. Audition required.

MUSAP 342 Jazz Drum Set (2-3) Primarily for jazz studies and percussion majors. Audition required for non-majors.

MUSAP 343 Private Instruction: Viola (2-3, max. 45) VLPA *Watras* Intended for undergraduate non-majors. Audition required.

MUSAP 363 Private Instruction: Viola (2-3, max. 27) VLPA *Watras* Intended for undergraduate majors. Audition required.

MUSAP 389 World Music (2-3, max. 18) I&S/ VLPA World music traditions taught by visiting native artists. Consult ethnomusicology staff for current offerings. Intended for undergraduate majors. Audition required. Credit/no credit only.

MUSAP 420 Private Instruction: Voice (2-3, max. 27) VLPA *Harper, Patrick* Intended for undergraduate majors. Audition required.

MUSAP 421 Private Instruction: Piano (2-3, max. 27) VLPA *McCabe, Michaelian, Seales, Sheppard* Intended for undergraduate majors. Audition required.

MUSAP 422 Private Instruction: Organ (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors. Audition required.

MUSAP 423 Private Instruction: Harpsichord (2-3, max. 27) VLPA *Terry* Intended for undergraduate majors. Audition required.

MUSAP 424 Private Instruction: Violin (2-3, max. 27) VLPA *Patterson* Intended for undergraduate majors. Audition required.

MUSAP 425 Private Instruction: Violoncello (2-3, max. 27) VLPA *Saks* Intended for undergraduate majors. Audition required.

MUSAP 426 Private Instruction: Double Bass (2-3, max. 27) VLPA *Lieberman* Intended for undergraduate majors. Audition required.

MUSAP 427 Private Instruction: Flute (2-3, max. 27) VLPA *Skowronek* Intended for undergraduate majors. Audition required.

MUSAP 428 Private Instruction: Oboe (2-3, max. 27) VLPA Intended for undergraduate majors. Audition required.

MUSAP 429 Private Instruction: Clarinet (2-3, max. 27) VLPA *McCull* Intended for undergraduate majors. Audition required.

MUSAP 430 Private Instruction: Bassoon (2-3, max. 27) VLPA *Grossman* Intended for undergraduate majors. Audition required.

MUSAP 431 Private Instruction: Saxophone (2-3, max. 27) VLPA *Brockman* Intended for undergraduate majors. Audition required.

MUSAP 432 Private Instruction: Horn (2-3, max. 27) VLPA *Kappy* Intended for undergraduate majors. Audition required.

MUSAP 433 Private Instruction: Trumpet (2-3, max. 27) VLPA Intended for undergraduate majors. Audition required.

MUSAP 434 Private Instruction: Trombone (2-3, max. 27) VLPA *Immel* Intended for undergraduate majors. Audition required.

MUSAP 435 Private Instruction: Tuba (2-3, max. 27) VLPA *Phillips* Intended for undergraduate majors. Audition required.

MUSAP 436 Private Instruction: Harp (2-3, max. 27) VLPA *Vokolek* Intended for undergraduate majors. Audition required.

MUSAP 437 Private Instruction: Percussion (2-3, max. 27) VLPA *Collier, Crusoe* Intended for undergraduate majors. Audition required.

MUSAP 438 Private Instruction: Guitar (2-3, max. 27) VLPA *Novacek* Intended for undergraduate majors. Audition required.

MUSAP 439 Private Instruction: Viola da Gamba (2-3, max. 27) VLPA *Tindemans* Intended for undergraduate majors. Audition required.

MUSAP 440 Timpani (2-3, max. 27) VLPA *Crusoe* Intended for undergraduate majors. Audition required.

MUSAP 441 Mallet Percussion (2-3, max. 27) VLPA *Collier* Intended for undergraduate majors. Audition required.

MUSAP 442 Jazz and Non-Western Drumming Techniques (2/3, max. 18) VLPA *Collier*
Focused study of American jazz drumming and/or hand drumming techniques of various world music cultures to broaden the skills of percussion students, preparing them for new demands of contemporary musical styles. Designed primarily for music undergraduates enrolled in the percussion program. Audition required.

MUSAP 463 Private Instruction: Viola (2-3, max. 27) VLPA *Watras* Intended for undergraduate majors. Audition required.

MUSAP 500 Private Instruction: Voice (2-3, max. 45) Harper, Patrick Intended for graduate non-majors. Audition required.

MUSAP 501 Private Instruction: Piano (2-3, max. 45) McCabe, Michaelian, Seales, Sheppard Intended for graduate non-majors. Audition required.

MUSAP 502 Private Instruction: Organ (2-3, max. 45) Terry Intended for graduate non-majors. Audition required.

MUSAP 503 Private Instruction: Harpsichord (2-3, max. 45) Terry Intended for graduate non-majors. Audition required.

MUSAP 504 Private Instruction: Violin (2-3, max. 45) Patterson Intended for graduate non-majors. Audition required.

MUSAP 505 Private Instruction: Violoncello (2-3, max. 45) Saks Intended for graduate non-majors. Audition required.

MUSAP 506 Private Instruction: Double Bass (2-3, max. 45) Lieberman Intended for graduate non-majors. Audition required.

MUSAP 507 Private Instruction: Flute (2-3, max. 45) Skowronek Intended for graduate non-majors. Audition required.

MUSAP 508 Private Instruction: Oboe (2-3, max. 45) Intended for graduate non-majors. Audition required.

MUSAP 509 Private Instruction: Clarinet (2-3, max. 45) McCull Intended for graduate non-majors. Audition required.

MUSAP 510 Private Instruction: Bassoon (2-3, max. 45) Grossman Intended for graduate non-majors. Audition required.

MUSAP 511 Private Instruction: Saxophone (2-3, max. 45) Brockman Intended for graduate non-majors. Audition required.

MUSAP 512 Private Instruction: Horn (2-3, max. 45) Kappy Intended for graduate non-majors. Audition required.

MUSAP 513 Private Instruction: Trumpet (2-3, max. 45) Intended for graduate non-majors. Audition required.

MUSAP 514 Private Instruction: Trombone (2-3, max. 45) Immel Intended for graduate non-majors. Audition required.

MUSAP 515 Private Instruction: Tuba (2-3, max. 45) Phillips Intended for graduate non-majors. Audition required.

MUSAP 516 Private Instruction: Harp (2-3, max. 45) Vokolek Intended for graduate non-majors. Audition required.

MUSAP 517 Private Instruction: Percussion (2-3, max. 45) Collier, Crusoe Intended for graduate non-majors. Audition required.

MUSAP 518 Private Instruction: Guitar (2-3, max. 45) Novacek Intended for graduate non-majors. Audition required.

MUSAP 519 Private Instruction: Viola da Gamba (2-3, max. 45) Tindemans Audition required.

MUSAP 520 Private Instruction: Voice (3, max. 18) Harper, Patrick Intended for graduate majors. Audition required.

MUSAP 521 Private Instruction: Piano (3, max. 18) McCabe, Michaelian, Sheppard Intended for graduate majors. Audition required.

MUSAP 522 Private Instruction: Organ (3, max. 18) Terry Intended for graduate majors. Audition required.

MUSAP 523 Private Instruction: Harpsichord (3, max. 18) Terry Intended for graduate majors. Audition required.

MUSAP 524 Private Instruction: Violin (3, max. 18) Patterson Intended for graduate majors. Audition required.

MUSAP 525 Private Instruction: Violoncello (3, max. 18) Saks Intended for graduate majors. Audition required.

MUSAP 526 Private Instruction: Double Bass (3, max. 18) Lieberman Intended for graduate majors. Audition required.

MUSAP 527 Private Instruction: Flute (3, max. 18) Skowronek Intended for graduate majors. Audition required.

MUSAP 528 Private Instruction: Oboe (3, max. 18) Intended for graduate majors. Audition required.

MUSAP 529 Private Instruction: Clarinet (3, max. 18) McCull Intended for graduate majors. Audition required.

MUSAP 530 Private Instruction: Bassoon (3, max. 18) Grossman Intended for graduate majors. Audition required.

MUSAP 531 Private Instruction: Saxophone (3, max. 18) Brockman Intended for graduate majors. Audition required.

MUSAP 532 Private Instruction: Horn (3, max. 18) Kappy Intended for graduate majors. Audition required.

MUSAP 533 Private Instruction: Trumpet (3, max. 18) Intended for graduate majors. Audition required.

MUSAP 534 Private Instruction: Trombone (3, max. 18) Immel Intended for graduate majors. Audition required.

MUSAP 535 Private Instruction: Tuba (3, max. 18) Phillips Intended for graduate majors. Audition required.

MUSAP 536 Private Instruction: Harp (3, max. 18) Vokolek Intended for graduate majors. Audition required.

MUSAP 537 Private Instruction: Percussion (3, max. 18) Collier, Crusoe Intended for graduate majors. Audition required.

MUSAP 538 Private Instruction: Guitar (3, max. 18) Novacek Intended for graduate majors. Audition required.

MUSAP 540 Timpani (3, max. 18) Crusoe Intended for graduate majors. Audition required.

MUSAP 541 Mallet Percussion (3, max. 18) Collier Intended for graduate majors. Audition required.

MUSAP 542 Private Instruction: Viola da Gamba (3, max. 18) Tindemans Intended for graduate majors. Audition required.

MUSAP 543 Private Instruction: Viola (2-3, max. 45) *Watras* Intended for graduate non-majors. Audition required. Offered: AWPSP.

MUSAP 563 Private Instruction: Viola (2-3, max. 45) *Watras* Intended for Master's degree candidates. Audition required. Offered: AWPSP.

MUSAP 570 Private Instruction: Voice (3, max. 27) *Harper, Patrick* Intended for graduate majors. Audition required.

MUSAP 571 Private Instruction: Piano (3, max. 27) *McCabe, Michaelian, Sheppard* Intended for graduate majors. Audition required.

MUSAP 572 Private Instruction: Organ (3, max. 27) *Terry* Intended for graduate majors. Audition required.

MUSAP 573 Private Instruction: Harpsichord (3, max. 27) *Terry* Intended for graduate majors. Audition required.

MUSAP 574 Private Instruction: Violin (3, max. 27) *Patterson* Intended for graduate majors. Audition required.

MUSAP 575 Private Instruction: Violoncello (3, max. 27) *Saks* Intended for graduate majors. Audition required.

MUSAP 576 Private Instruction: Double Bass (3, max. 27) *Lieberman* Intended for graduate majors. Audition required.

MUSAP 577 Private Instruction: Flute (3, max. 27) *Skowronek* Intended for graduate majors. Audition required.

MUSAP 578 Private Instruction: Oboe (3, max. 27) Intended for graduate majors. Audition required.

MUSAP 579 Private Instruction: Clarinet (3, max. 27) *McColl* Intended for graduate majors. Audition required.

MUSAP 580 Private Instruction: Bassoon (3, max. 27) *Grossman* Intended for graduate majors. Audition required.

MUSAP 581 Private Instruction: Saxophone (3, max. 27) *Brockman* Intended for graduate majors. Audition required.

MUSAP 582 Private Instruction: Horn (3, max. 27) *Kappy* Intended for graduate majors. Audition required.

MUSAP 583 Private Instruction: Trumpet (3, max. 27) Intended for graduate majors. Audition required.

MUSAP 584 Private Instruction: Trombone (3, max. 27) *Immel* Intended for graduate majors. Audition required.

MUSAP 585 Private Instruction: Tuba (3, max. 27) *Phillips* Intended for graduate majors. Audition required.

MUSAP 586 Private Instruction: Harp (3, max. 27) *Vokolek* Intended for graduate majors. Audition required.

MUSAP 587 Private Instruction: Percussion (3, max. 27) *Collier, Crusoe* Intended for graduate majors. Audition required.

MUSAP 588 Private Instruction: Guitar (3, max. 27) *Novacek* Audition required.

MUSAP 589 World Music Laboratory (2-3, max. 18) World music traditions taught by visiting artists with emphasis on cultural pedagogy and traditional theory. The particular culture studied changes from year to year. Required of all graduate students in ethnomusicology. Credit/no credit only. Audition required.

MUSAP 590 Timpani (3, max. 27) *Crusoe* Intended for graduate majors. Audition required.

MUSAP 591 Mallet Percussion (3, max. 27) *Collier* Intended for graduate majors. Audition required.

MUSAP 592 Private Instruction: Viola da Gamba (3, max. 27) *Tindemans* Intended for graduate majors. Audition required.

MUSAP 593 Private Instruction: Viola (2-3, max. 45) *Watras* Intended for Doctoral degree candidates. Audition required. Offered: AWPSP.

Music Education

MUSED 301 Techniques for Teaching Music to Children (2) VLPA Campbell Exercises and applied experiences in sight-singing and error detection, keyboard skills, record and instruments of the Orff ensemble relevant to the teaching of music to children. Prerequisite: either MUSIC 212 or MUSIC 302; MUSAP 135.

MUSED 304 Introductory Music Methods (2, max. 4) VLPA Demorest, Morrison Comprehensive examination of materials for training beginning vocal and instrumental students. Topics include recruiting, motivation, and problems associated with evaluation. Methods of starting beginners and rehearsing ensembles are demonstrated with techniques addressing problems unique to public school ensemble instruction. Must be taken concurrently with MUSED 301; MUSED 340. Offered: A.

MUSED 305 Introductory Music Methods II (2, max. 4) VLPA Demorest Morrison Comprehensive examination of materials for training beginning vocal and instrumental students. Topics include recruiting, motivation, problems associated with evaluation. Methods of starting beginners and rehearsing ensembles are demonstrated with techniques addressing problems unique to public school ensemble instruction. Offered: W.

MUSED 306 Introductory Music Methods III (2, max. 4) VLPA Demorest, Morrison Comprehensive examination of materials for training beginning vocal and instrumental students. Topics include recruiting, motivation, problems associated with evaluation. Methods of starting beginners and rehearsing ensembles are demonstrated with techniques addressing problems unique to public school ensemble instruction. Offered: Sp.

MUSED 340 Music in Education (3) VLPA Demorest An orientation to the broad scope of issues regarding music in the schools (K-12), including curriculum, the development of instructional strategies, and evaluation techniques.

MUSED 401 Tin Pan Alley: Concepts and Teaching Strategies for Music Educators (1) VLPA Overview of Tin Pan Alley phenomenon that dominated the American popular music industry for nearly 70 years. For music educators. Focuses on cooperative learning strategies and performance considerations in the

school environment. Recommended: MUSIC 162.

MUSED 402 Rock and Roll Roots for Music Educators (1) VLPA Overview of the musical and cultural roots of American Rock and Roll for music educators. Explores teaching strategies and performance possibilities in the school environment. Recommended: MUSIC 162.

MUSED 403 Part-Time Student Teaching in Music (6) VLPA Campbell, Demorest, Morrison Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Offered: AWPSP.

MUSED 404 Full-Time Student Teaching in Music (15) VLPA Campbell, Demorest, Morrison Supervised teaching internship. Directed observations of distinguished teachers in an elementary or secondary music setting. Weekly seminars. Credit/no credit only. Prerequisite: MUSED 403. Offered: AWPSP.

MUSED 405 Marching Band Technique (2) VLPA McDavid, Morrison, Salzman Basics of marching and maneuvering discussed and used to write drill. Covers selection of music, use of marching procession, and show design. Students complete a drill for their own band or for an instrumentation determined by the instructor.

MUSED 410 Instrumental Rehearsal Techniques (3) VLPA Salzman Includes score preparation, rehearsal formats, and error detection.

MUSED 431 Curriculum in Music Education (3) VLPA Campbell, Demorest, Morrison Principles and practices of curriculum design applied to the development of the music curriculum. Individual or group work on elementary and secondary school music curriculum projects.

MUSED 432 Comprehensive Music in the Secondary School (3) VLPA Demorest The teaching of music and its literature in music classes other than traditional ensembles from grade six through adults. Prerequisite: MUSED 340.

MUSED 440 Music for Children (3) VLPA Campbell Identification and selection of appropriate objectives, materials, teaching strategies and evaluation techniques used in teaching music from birth through grade five, with consideration of various approaches (e.g., Delcroze, Kodaly, Orff) for the musical development of children. Prerequisite: MUSED 302; MUSED 340.

MUSED 442 Instrumental Curriculum: Methods and Materials (3) VLPA Morrison Study of the organization and administration of school instrumental music; the selection and use of materials and teaching strategies from beginning to advanced levels of instrumental instruction. Prerequisite: MUSED 340.

MUSED 443 Choral Curriculum: Methods and Materials (3) VLPA Demorest Study of the organization and administration of school choral music; the selection and use of materials and teaching strategies from beginning to advanced levels of choral instruction. Prerequisite: MUSED 340.

MUSED 452 Ethnomusicology in the Schools (3) VLPA Campbell Issues, teaching materials,

and techniques involved in incorporating music cultures of United States and related world music repertoires in K-12 classroom instruction. Prerequisite: MUSED 340.

MUSED 453 Approaches to Classroom Instruction: K-12 (3) VLPA *Campbell* Examines such major instructional approaches as MMCP, Orff, Kodaly, and Dalcroze. Included are the philosophy of each and the methods, materials, and instructional skills needed for classroom application. Prerequisite: MUSED 403.

MUSED 465 Classroom Management and Evaluation in Music Education (3) VLPA *Morrison* Provides future teachers with strategies and techniques for classroom management, motivation, assessment, and evaluation for applications to K-12 school music programs. Prerequisite: MUSED 340.

MUSED 475 Teaching the Music of Selected Cultures (1, max. 6) VLPA *Campbell* Music and culture of a specific world region with particular attention to songs, stories, and instrumental pieces applicable to the teaching of music and the arts in elementary and secondary schools.

MUSED 480 Music Methods for Classroom Teachers (3) VLPA *Campbell* Addresses the basic fundamentals of music and methods for teaching K-6 school children. Topics include repertoire appropriate for different age levels, methods and materials for integrating music into the K-6 curriculum.

MUSED 496 Special Topics in Music Education (1-3, max. 10) VLPA Special studies designed to reflect contemporary emphases and concerns in the music education profession.

MUSED 501 Introduction to Research in Music Education (3) Campbell, Demorest, Morrison Seminar in research design and method with emphasis on identification of problems in music instruction, interpretation of data, and application of findings to classroom settings.

MUSED 502 Quantitative Research in Music Education (3) Campbell, Demorest, Morrison Seminar in quantitative research utilizing experimental, quasi-experimental, and descriptive design, with emphasis on the pursuit of solutions to pedagogical problems through appropriate research procedures, analysis, and interpretation of findings. Prerequisite: MUSED 501.

MUSED 503 Qualitative Research in Music Education (3) Campbell, Demorest, Morrison Examination of qualitative modes of inquiry (including ethnographic, case study, phenomenological, and historical) to music instruction in classroom, studio, and community settings. Prerequisite: MUSED 502.

MUSED 522 Psychology of Music Learning and Teaching (3) Campbell, Demorest, Morrison Examines previous research in areas related to music cognition, including music perception, music performance, musical creativity, musical affect, musical preference, and social psychology. Explores how this research relates to curriculum and practice in music education. Role of theory, method, and procedure for psychological research in music education.

MUSED 523 Tests and Measurement (3) Campbell, Demorest, Morrison Examination of currently published aptitude and achievement tests in music and their uses in music education.

Explores the basic methods for constructing classroom tests and their use in evaluation. Selected readings include researching test construction and application of tests and measurement to program evaluation.

MUSED 524 Seminar in Music Education (3) Campbell, Demorest, Morrison Special problems in the teaching and supervision of music in the elementary grades. Prerequisite: one year of teaching experience.

MUSED 525 Seminar in Music Education (3) Campbell, Demorest, Morrison Special problems in the teaching and administration of music in the secondary school and community college. Prerequisite: one year of teaching experience.

MUSED 530 Administration and Supervision in Music Education (3) Campbell, Demorest, Morrison Survey of issues in policy and systems for facilities, student/personnel, technology, school/community relations, and special programs in music education. Focuses on evaluating and improving existing programs. Includes supervision of student teachers.

MUSED 535 Seminar in Musical Development (3) Campbell, Demorest, Morrison Critical review of theories, methods of inquiry, designs, and conclusions of research in musical development from early childhood through adolescence. Emphasis on evaluating theories and methods of studying musical development and exploring their relationship to theories of general intellectual development; adult music cognition research; and curriculum and practice in music education.

MUSED 540 History of American Music Education (3) Campbell, Demorest, Morrison A chronological examination of individual, social, and political events, and educational philosophies, that characterized the development of music instruction in American schools from colonial times to the present.

MUSED 542 Comparative Music Education (3) Campbell, Demorest, Morrison A transcultural examination of philosophy and practice of music instruction.

MUSED 550 Proseminar in Music Education (3) Campbell, Demorest, Morrison Examination of the major literature in the philosophy, history, psychology, and sociology of formal school music instruction.

MUSED 552 World Music Education (3) Campbell Seminar on issues of multiculturalism and the world music "movement" as they affect school music curriculum and instruction. Curricular content and cultural context examined in relation to teaching K-12 students, teachers, and undergraduate students in music education programs. Offered: AWPpS.

MUSED 560 Contemporary Issues in Music Education (1-3, max. 6) Campbell, Demorest, Morrison Seminar focusing on review of literature on psychological and sociological aspects of music education, including historical and philosophical foundations of music education in the United States. Appropriate for MA students seeking guidance in preparation of topic for examinations. Prerequisite: MUSED 501.

MUSED 561 Seminar in Theories of Music Instruction (3, max. 9) Campbell, Demorest, Morrison Theories of music instruction, with special attention to curriculum, instructional procedures, and assessment of learning.

Prerequisite: MUSED 501 or permission of instructor.

MUSED 575 Seminar in Music Education Research (1-3, max. 6) Campbell, Demorest, Morrison Examines research and research-based issues relevant to music instruction and learning. Doctoral students should register each quarter until successful completion of general examination. Offered: A.

Music Ensemble

MUSEN 100 University Singers (1, max. 15) VLPA Credit/no credit only.

MUSEN 300 University Symphony Orchestra (1, max. 15) VLPA .

MUSEN 301 Wind Ensemble (1, max. 15) VLPA *Salzman* .

MUSEN 302 Symphonic Band (1, max. 10) VLPA *Salzman* .

MUSEN 303 Marching Band (2, max. 10) VLPA *McDavid* .

MUSEN 304 Percussion Ensemble (1, max. 12) VLPA *Collier* .

MUSEN 305 Brass Ensemble (1, max. 12) VLPA *Kappy* .

MUSEN 306 Woodwind Ensemble (1, max. 12) VLPA *Skowronek* .

MUSEN 307 Recital Choir (1, max. 15) VLPA *Kaplan* Choir presents two recital programs per quarter, surveying a wide variety of repertoire of all styles and periods. Credit/no credit only.

MUSEN 308 Guitar Ensemble (1, max. 18) VLPA *Novacek* Study and performance works for two, three, and four guitars and one guitar with various solo instruments or voice. Designed for guitar performance majors. Other instrumentalists may register with instructor's permission. Offered: AWPpS.

MUSEN 309 Concert Band (1, max. 10) VLPA *Salzman* Open for membership without audition to students from any major field of study as well as faculty and community members. This ensemble is also an outstanding forum for music majors to refine skills on primary or secondary instruments. Offered: AWPpS.

MUSEN 325 Accompanying (2, max. 30) VLPA .

MUSEN 340 Vocal Jazz Ensemble (1, max. 6) VLPA Credit/no credit only.

MUSEN 345 Jazz Workshop (1, max. 12) VLPA *Collier, Seales* .

MUSEN 346 Studio Jazz Ensemble (1, max. 6) VLPA .

MUSEN 347 Opera Chorus (1, max. 12) VLPA *Kaplan* .

MUSEN 350 University Chorale (1, max. 12) VLPA Credit/no credit only.

MUSEN 351 Chamber Singers (1, max. 15) VLPA *Boers* .

MUSEN 361 Piano Ensemble (1, max. 3) VLPA Study and performance of works for four hands

at one or two pianos. Designed for upper-level piano majors or students with equivalent ability.

MUSEN 368 Harp Ensemble (1, max. 12) VLPA
Vokolek .

MUSEN 369 Baroque Chamber Ensemble (1, max. 18) VLPA
Terry, Tindemans .

MUSEN 375 Opera Workshop (1, max. 6) VLPA
Zahn Preparation of music theatre repertoire. Intended for the mature voice student.

MUSEN 381 Chamber Music (1, max. 18) VLPA
.

MUSEN 382 Opera Theatre (2, max. 6) VLPA
Zahn Public performance of roles in opera.

MUSEN 383 Collegium Musicum (1, max. 6) VLPA
Tindemans .

MUSEN 384 Contemporary Group (1, max. 6) VLPA
Durand Exploration of notation and performance problems in today's music; preparation for public performance. Credit/no credit only.

MUSEN 410 Steelband (1, max. 6) VLPA
Performing and arranging techniques for the steelband, and percussion, in a variety of Caribbean and Latin American music styles, including calypso, soca, reggae, and salsa.

MUSEN 446 Advanced Studio Jazz Ensemble (1, max. 9) VLPA
Preparation and performance of material appropriate to large jazz ensemble concerts, clinics, and radio and television broadcasts. Recommended: three quarters of MUSEN 346.

MUSEN 500 University Symphony Orchestra (1, max. 9) .

MUSEN 501 Wind Ensemble (1, max. 9)
Salzman .

MUSEN 503 Marching Band (2, max. 6)
McDavid .

MUSEN 504 Percussion Ensemble (1, max. 9)
Collier .

MUSEN 505 Brass Ensemble (1, max. 9)
Kappy .

MUSEN 506 Woodwind Ensemble (1, max. 9)
Skowronek .

MUSEN 507 Recital Choir (1, max. 9) VLPA
Kaplan Choir presents two recital programs per quarter, surveying a wide variety of repertoire of all styles and periods. Credit/no credit only.

MUSEN 508 Guitar Ensemble (1, max. 9) VLPA
Novacek Study and performance works for two, three, and four guitars and one guitar with various solo instruments or voice. Designed for guitar performance majors. Other instrumentalists may register with instructor's permission. Offered: AWSp.

MUSEN 525 Accompanying (2, max. 18) .

MUSEN 540 Vocal Jazz Ensemble (1, max. 9)
Credit/no credit only.

MUSEN 545 Jazz Workshop (1, max. 9)
Collier, Seales .

MUSEN 546 Studio Jazz Ensemble (1, max. 9).

MUSEN 547 Opera Chorus (1, max. 9)
Kaplan .

MUSEN 550 University Chorale (1, max. 9)
Credit/no credit only.

MUSEN 551 Chamber Singers (1, max. 9)
Boers .

MUSEN 561 Piano Ensemble (1, max. 9)
Study and performance of works for four hands at one or two pianos. Designed for upper-level piano majors or students with equivalent ability.

MUSEN 568 Harp Ensemble (1, max. 9)
Vokolek .

MUSEN 569 Baroque Chamber Ensemble (1)
Terry, Tindemans .

MUSEN 575 Opera Workshop (1, max. 9) Zahn
Preparation of music theatre repertoire. Intended for the mature voice student.

MUSEN 580 Sinfonietta (1, max. 9) .

MUSEN 581 Chamber Music (1, max. 9) .

MUSEN 582 Opera Theatre (2, max. 18) Public performance of roles in opera.

MUSEN 583 Collegium Musicum (1, max. 9)
Tindemans .

MUSEN 584 Contemporary Group (1, max. 9)
Durand Exploration of notation and performance problems in today's music; preparation for public performance. Credit/no credit only.

Music History

MUHST 210 Introduction to the History of Western Music I (3) VLPA
Taricani Introduction to the critical study of Western music history, including representative composers, works, and genres, as well as significant concepts and issues. Origins of Western Music. Prerequisite: 2.0 in MUHST 212. Offered: A.

MUHST 211 Introduction to the History of Western Music II (3) VLPA
Starr, Taricani Introduction to the critical study of Western music history, including representative composers, works, and genres, as well as significant concepts and issues. Baroque and Classical Periods. Prerequisite: either 3.0 in MUSIC 120 or minimum score of 80% on music history placement test. Offered: W.

MUHST 212 Introduction to the History of Western Music III (3) VLPA
Starr Introduction to the critical study of Western music history including representative composers, works, and genres as well as significant concepts and issues. Nineteenth and Twentieth Centuries. Prerequisite: 2.0 in MUHST 211. Offered: Sp.

MUSIC 260 Orchestral Music (5) VLPA
Orchestral music from its beginnings in the seventeenth century through recent developments; evolution of the symphony.

MUSIC 261 Mozart (5) VLPA Introduction to Mozart's music and to musical life in Habsburg Austria during the Enlightenment. Mozart's musical personality studied through masterpieces in all genres, with principal emphasis on listening. Ability to read music not required.

MUSIC 262 Introduction to Twentieth-Century Music (3) VLPA
Starr Listener's survey of

important composers and trends from Debussy through electronic music.

MUSIC 263 Opera (5) VLPA Contributions of music, text, and staging; study of representative works concentrating on problems of combining these elements into a composite work of art.

MUSIC 264 Sacred Music in the European Tradition (5) VLPA Surveys European and American sacred music from the 12th to 20th centuries, examining the important role of music in religious worship. Considers the means composers used to make musical works sound the way they do to convey the messages of the texts through music. Offered: jointly with RELIG 264.

MUHST 301 Music and the American Experience (3) I&S/VLPA
Starr Survey of American music from the colonial period to the present day, with emphasis on in-depth examination of representative works from both cultivated and vernacular traditions. Prerequisite: MUHST 210; MUSIC 303; MUSIC 306. Offered: WSp.

MUHST 310 Perspectives in Music History (3, max. 6) I&S/VLPA Overview of different stylistic periods in music history. Perspectives include music and philosophy, music and gender, and music and text. Students develop an insight into the manner in which similar questions have been approached in diverse cultures and periods. Prerequisite: MUHST 210; MUSIC 303; MUSIC 306. Offered: WSp.

MUHST 311 Beethoven in Western Culture (3) I&S/VLPA Comprehensive study of Beethoven's works and their nineteenth- and twentieth-century reception, with consideration of how Western culture has used Beethoven's music in its constructions of subjectivity, genius, and national and other collective identities. Prerequisite: MUSIC 303; MUSIC 306; MUHST 210. Offered: WSp.

MUHST 330 Music in the United States (5) VLPA Contribution of music to the development of American culture.

MUHST 400 Medieval Music: To 1400 (3) VLPA
Taricani Critical readings on issues in medieval music. Works to be studied included repertory from chant, motets, and sacred and secular music of the Middle Ages.

MUHST 401 Early British Music: 1300-1700 (3) VLPA
Taricani Examines the history of British music from its earliest polyphony through the music of Purcell. Stylistic features of English music studied, including medieval polyphony, Tudor music, Elizabethan music, and seventeenth-century music through Purcell.

MUHST 402 Late Renaissance Secular Music: 1525-1630 (3) VLPA
Taricani The madrigal in Italy, England, and Germany. The Chanson, Jannequin through Lassus.

MUHST 403 Late Renaissance Sacred and Instrumental Music: 1525-1630 (3) VLPA
Taricani Latin church music. Willaert through G. Gabrieli; early Reformation church music, Walther through Gibbons; instrumental music, Cabezon, the English virginal school, and Sweelinck.

MUHST 404 Baroque Keyboard Music (3) VLPA Forms and styles: Frescobaldi through J.S. Bach and C.P.E. Bach.

MUHST 405 Orchestral Music: 1620-1760 (3)
VLPA Corelli through the Mannheim School. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 406 Baroque Choral Music (3) VLPA
Bozarth Monteverdi through Handel. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 407 Baroque Opera (3) VLPA
Monteverdi through Handel.

MUHST 408 Keyboard Music: 1760-1830 (3)
VLPA *Bozarth* Haydn through Schubert. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 409 Chamber Music: 1760-1830 (3)
VLPA Haydn through Schubert. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 410 Orchestral Music: 1760-1830 (3)
VLPA Haydn through early Berlioz.

MUHST 411 Art Song, 1760-1830 (3) VLPA The art song in European culture during the Classical and early Romantic periods. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 412 Choral Music: 1750-1830 (3) VLPA Large works for chorus and orchestra, Haydn through Beethoven.

MUHST 413 Opera: 1750-1830 (3) VLPA Gluck through Bellini.

MUHST 414 Keyboard Music: 1830-1915 (3)
VLPA *Bozarth* Schumann through Debussy. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 415 Chamber Music: 1830-1915 (3)
VLPA Schumann through Ravel. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 416 Orchestral Music: 1830-1915 (3)
VLPA Schumann and Mendelssohn through early Schoenberg and Stravinsky. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 417 Art Song: 1830-1915 (3) VLPA
Bozarth The Lieder of Schumann, Brahms, Wolf, Strauss, Mahler, and Schoenberg. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 418 Choral Music: 1830-1915 (3) VLPA
Bozarth Selected choral masterpieces. Mendelssohn through Schoenberg.

MUHST 419 Opera: 1830-1915 (3) VLPA German, French, and Italian operatic traditions. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 420 Authenticity and Performance (3)
VLPA The practical and philosophical issues raised by historically informed performance of early music on period instruments. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 421 Music Criticism (3) VLPA *Starr* Study of the various forms of music criticism, with an emphasis on the writing of valid examples and evaluation of one's own work along with that of

others — classmates, journalists, and academic critics. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 422 Gender and Music (3) VLPA *Tsou* Investigates how gender issues have shaped the creation and perception of music; introduces women composers and their music. Topics include writing women's biography; creation of the music canon; gender issues in opera; intertwining issues of race, class, and gender, blues women; and popular music. Offered: W. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 423 Twentieth-Century Music to 1945 (3) VLPA *Starr* Intensive study of selected composers and works exemplifying the new vocabularies, grammars, and styles of the early part of the twentieth century. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 424 Music Since 1945 (3) VLPA *Starr* Diversity of the contemporary musical scene. Vocabularies appropriate for the description and understanding of the new music, developed through study of representative composers and works, and appropriate readings. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 425 Jazz History and Analysis (3)
VLPA *Collier* Major eras and styles of jazz with emphasis on technical aspects of jazz music: composition, arranging, improvisation practices. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 426 American Popular Music (3) VLPA *Starr* An in-depth consideration of American popular music styles and repertory from about 1920 to the present day. Analysis of representative pieces; consideration of critical and aesthetic issues relating to popular music; relationship of popular music to "art" music and to American culture and society. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 429 Music, Literature, and the Arts (3)
VLPA Literary and visual art works that include musical subject matter and forms; musical genres that incorporate other arts such as opera and ballet. Related philosophical writings. Includes works of a particular time period or investigation of a specific problem in comparative arts. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 497 Special Topics in Music History (1-3, max. 6) VLPA Topics vary each quarter. Prerequisite: 2.0 in MUHST 210; 2.0 in MUSIC 303; 2.0 in MUSIC 306.

MUHST 500 Seminar in Methods of Music Research (3) Taricani Explores various critical approaches to research in music at the graduate level, examining specialized bibliographical resources, controversial arguments about musical issues, and other matters of musical criticism required to begin advanced study of music. Prerequisite for all graduate music history courses except MUHST 515.

MUHST 503 Readings in Medieval and Renaissance Music (5) Taricani Musical styles, genres, and forms of the Middle Ages and Renaissance. Focuses upon musicological problems and controversy related to music composed between ca. 1000 and 1600. Prerequisite: permission of instructor.

MUHST 504 Seminar in Medieval Music (3, max. 6) Taricani Prerequisite: MUHST 500.

MUHST 505 Seminar in Renaissance Music (3, max. 6) Taricani Prerequisite: MUHST 500.

MUHST 506 Seminar in Baroque Music (3, max. 6) Bozarth Prerequisite: MUHST 500.

MUHST 508 Seminar in the Viennese Classical Period: 1760-1830 (3, max. 6)
Bozarth Prerequisite: MUHST 500.

MUHST 509 Seminar in Nineteenth-Century Music: 1830-1890 (3, max. 6) Bozarth Prerequisite: MUHST 500.

MUHST 510 Seminar in Music Since 1890 (3, max. 6) Starr Prerequisite: MUHST 500.

MUHST 515 Seminar in Medieval and Renaissance Notation (5) Taricani Gregorian chant through sixteenth-century prints.

MUHST 519 Seminar in Modern Editorial Procedures (5) Bozarth Study of modern procedures for preparing critical editions. Related areas of study may include analysis of musical style and historical and performance problems inherent in works being edited.

MUHST 520 Seminar in American Music (3, max. 6) Starr Research in the life, works, and times of composers in the United States from colonial days to the present. Prerequisite: MUHST 500 .

MUHST 537 Seminar on Opera (3, max. 6) Prerequisite: MUHST 500.

Near Eastern Languages and Civilization

Akkadian

AKKAD 401 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 402 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 403 Elementary Akkadian (3) Introduction to the Akkadian language (Assyrian and Babylonian). Readings in original Akkadian cuneiform from historical, legal, and literary texts.

AKKAD 421 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

AKKAD 422 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

AKKAD 423 Intermediate Akkadian (3) VLPA Readings in Akkadian texts.

Arabic

ARAB 401 Intensive Elementary Arabic (15) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

ARAB 411 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.).

ARAB 412 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 411.

ARAB 413 Elementary Arabic (5) Study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 401 taken.) Prerequisite: ARAB 412.

ARAB 414 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 415 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 416 Spoken Arabic (3) Study of grammar with emphasis on oral drill in modern spoken Arabic (Western or Eastern).

ARAB 421 Intermediate Arabic (5) VLPA
Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: either ARAB 401 or ARAB 413.

ARAB 422 Intermediate Arabic (5) VLPA
Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 421.

ARAB 423 Intermediate Arabic (5) VLPA
Reading of selected texts in standard Arabic, with continuing emphasis on grammar and syntax. Prerequisite: ARAB 422.

ARAB 424 Intensive Intermediate Arabic (15) VLPA
Equivalent to one year of study of standard Arabic at intermediate level. Extension of knowledge in grammar, syntax and vocabulary, and skills in reading, writing, and conversation. May not be taken for credit if ARAB 421, 422, 423 previously taken for credit. Prerequisite: either ARAB 401 or ARAB 413. Offered: S.

ARAB 431 Advanced Arabic (5) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 423.

ARAB 432 Advanced Arabic (5) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 431.

ARAB 433 Advanced Arabic (5) VLPA Focus on Arabic at the advanced level through in-depth examination of grammar, reading of selected texts, and brief surveys of some major reference materials. Prerequisite: ARAB 432.

ARAB 451 Adab Prose: Jahiz (3) VLPA
Readings in early Arabic prose. Prerequisite: ARAB 432.

ARAB 452 Maqamat: Hamadhani, Hariri (3) VLPA
MacKay Reading of several maqamat (essays in rhymed prose) of al-Hamadhani and al-Hariri. Examination of the maqamat genre as a whole. Prerequisite: ARAB 432.

ARAB 453 Historical Texts (3) I&S/VLPA
Readings in Arab historians with particular reference to scholars such as Tabari, Ibn al-Jawzi, and Ibn al-Athir. Prerequisite: ARAB 432.

ARAB 454 Quran and Its Interpretation (3) VLPA
Reading of selected passages from the

Quran in relation to their interpretation in classical commentaries (tafsir) and in legal texts (ahkam al-Quran). Focus on the various types of classical scholarship applied to the text of the Quran (ulum al-Quran). Prerequisite: ARAB 432.

ARAB 455 Ritual and Legal Texts (3) VLPA
Selected readings from well-known Islamic legal texts (furu al-fiqh) with attention to the sources of the law and methods of exegesis (usul al-fiqh). Prerequisite: ARAB 432.

ARAB 456 Islamic Political Theorists (3) I&S/VLPA
Readings from the main political theorists: al-Baghdadi, al-Mawardi, and Ibn Khaldun. Prerequisite: ARAB 432.

ARAB 457 Grammatical and Lexical Texts (3) VLPA
Introduction to concepts and terminology of Arabic grammar and lexicography through readings from scholars such as Sibawayh, Ibn Aqil, and Ibn Manzur. Prerequisite: ARAB 432.

ARAB 458 Modern Poetry (3) VLPA
DeYoung Neoclassical poetry of the nineteenth and twentieth centuries, and the development of modern verse. Prerequisite: ARAB 432.

ARAB 459 Islamic Philosophical Literature (3) I&S/VLPA
Reading of selected texts by representative Islamic philosophers. Prerequisite: ARAB 432.

ARAB 460 Islamic Theological and Mystical Literature (3) VLPA
Reading of selected texts representative of Islamic theological and mystical schools. Prerequisite: ARAB 432.

ARAB 461 Modern Prose (3) VLPA
DeYoung Modern essays, fiction, and ideological writings. Prerequisite: ARAB 432.

ARAB 462 Sirah and Maghazi Texts (3) I&S/VLPA
Reading and discussion of selected historical texts devoted to the life of the Prophet Muhammad, such as Ibn Ishaq, Ibn Hisham, al-Waqidi, Ibn Sa'd, and al-Bayhaqi. Some attention to related genres and contemporary scholarship. Prerequisite: ARAB 432.

ARAB 470 Stories of the Prophets (3) I&S/VLPA
Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with HEBR 470.

ARAB 472 Quran and Bible Masorah (3) VLPA
Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 432, HEBR 427, or HEBR 432. Offered: jointly with HEBR 472.

ARAB 481 South Arabian Epigraphic (3) VLPA
Introduction to epigraphic languages used in Southern Arabia from first half of first millennium BCE to mid-fifth century CE. Overview of script, basic grammar, and vocabulary with readings from selected Minaic, Sabaic, Qatabanic, and Hadramitic inscriptions. No previous study of Arabic required. .

ARAB 482 North Arabic Inscriptions (3) VLPA
Introduction to Arabic Languages of pre-Islamic Northern Arabia from 6th century B.C.E. to 5th century C.E. Overview of scripts, grammar and vocabulary with readings from Thaudic,

Taymanite, Dedanite, Lihyanite, Safaitic, and Hassean. No previous Arabic study required. Prerequisite: either ARAB 423, HEBR 423, or HEBR 426.

ARAB 490 Supervised Study (1-6, max. 18)
Special work in literary texts for graduates and undergraduates. Prerequisite: ARAB 423.

ARAB 496 Special Studies in Arabic (3-5, max. 15) VLPA
Topics vary. Offered occasionally by visiting or resident faculty.

ARAB 499 Undergraduate Research (1-6, max. 18) .

ARAB 596 Special Studies in Arabic (3-5, max. 15)
Topics vary. Offered occasionally by visiting or resident faculty.

ARAB 600 Independent Study or Research (*)

Aramaic

ARAMIC 411 Syriac (3)
Walker Beginning Syriac including basic grammar and vocabulary with selected readings from simple prose passages and poetry selected from early Christian and other late antique writings. No previous study of Aramaic required Offered: A.

ARAMIC 412 Syriac (3)
Walker Beginning Syriac including basic grammar and vocabulary with selected readings from simple prose passages and poetry selected from early Christian and other late antique writings. No previous study of Aramaic required. Offered: W.

ARAMIC 421 Biblical Aramaic (5) VLPA
Noegel Fundamentals of Aramaic grammar and the differences that distinguish Aramaic from Hebrew, includes select Aramaic portions of the Bible. Emphasis on grammar and comprehension. Designed for students with some knowledge of Hebrew. Prerequisite: HEBR 333 or HEBR 426.

ARAMIC 422 Targumic Aramaic (5) VLPA
Noegel The Targum (ancient Aramaic translation) of the Hebrew Bible forms an important basis for biblical interpretation. Emphasis on comprehension and interpretive strategies. Recommended: knowledge of Hebrew and/or Aramaic. Prerequisite: HEBR 333 or HEBR 426.

ARAMIC 423 Readings in Syriac (3) VLPA
Walker Readings from selected passages in Biblical and Christian literature with emphasis on writings of late antique and medieval Christian communities of Syria, Iraq, and Iran until the Mongol invasions. Prerequisite: ARAM 412. Offered: Sp.

ARAMIC 451 Aramaic Epigraphy (3, max. 6) VLPA
Noegel, Walker, Examination of selected Aramaic inscriptions with particular focus on different languages and periods including ancient and imperial Aramaic, and late antique Aramaic epigraphy, such as Nabataean, Palmyrene, and Hatran.

Egyptian

EGYPT 410 Hieroglyphic Egyptian (5) VLPA
Noegel Provides an introduction to hieroglyphic Egyptian as written during the Middle Kingdom (c. 2040-1782 BCE). Focuses on reading and writing hieroglyphics, including reading a complete Egyptian text. No knowledge of Egyptian or any other Near Eastern language is required.

EGYPT 411 Introduction to Coptic (5) Williams
Elements of grammar of the Sahidic dialect of the Coptic language.

EGYPT 422 Readings in Coptic (3) VLPA Williams
Readings from ancient Coptic Christian literature, with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

EGYPT 423 Readings in Coptic (3) VLPA Williams
Readings from ancient Coptic Christian literature, with emphasis on the *Nag Hammadi* texts. Prerequisite: COPTC 411 or EGYPT 411.

Hebrew

HEBR 401 Intensive Elementary Modern Hebrew (15) Intensive study of grammar, with oral and written drill and reading of simple texts. (Cannot be taken for credit if 411, 412, 413 taken.) Offered: S.

HEBR 404 Beginning Modern Hebrew (3)
Reading, writing, listening, and speaking skills in modern Israeli Hebrew. Not open for credit to student who have taken HEBR 401 or HEBR 411/412/413.

HEBR 405 Beginning Modern Hebrew (3)
Reading, writing, listening, and speaking skills in modern Israeli Hebrew. Not open for credit to student who have taken HEBR 401 or HEBR 411/412/413.

HEBR 406 Beginning Modern Hebrew (3)
Reading, writing, listening, and speaking skills in modern Israeli Hebrew. Not open for credit to student who have taken HEBR 401 or HEBR 411/412/413.

HEBR 407 Beginning Modern Hebrew (3)
Reading, writing, listening, and speaking skills in modern Israeli Hebrew. Not open for credit to student who have taken HEBR 401 or HEBR 411/412/413.

HEBR 411 Elementary Modern Hebrew (5) Sokoloff
Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.).

HEBR 412 Elementary Modern Hebrew (5) Sokoloff
Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 411.

HEBR 413 Elementary Modern Hebrew (5) Sokoloff
Modern Israeli Hebrew. Core vocabulary, grammar, conversational text, and oral and written communication. Excerpts from modern Hebrew prose and poetry. (Cannot be taken for credit if 401 taken.) Prerequisite: HEBR 412.

HEBR 414 Elementary Biblical Hebrew (5) Noegel
Offers an inductive introduction to the biblical Hebrew language. Covers the basics of Hebrew grammar while reading the stories of Joseph in the book of Genesis. No prior knowledge of Hebrew necessary.

HEBR 415 Elementary Biblical Hebrew (5) Noegel
Continues the inductive introduction to the biblical Hebrew language begun in HEBR 414. Moves beyond the textbook and into select portions of the Hebrew Bible. Prerequisite: HEBR 331 or HEBR 414.

HEBR 421 Intermediate Modern Hebrew (5) VLPA Sokoloff
Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: either HEBR 401 or HEBR 413.

HEBR 422 Intermediate Modern Hebrew (5) VLPA Sokoloff
Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: HEBR 421.

HEBR 423 Intermediate Modern Hebrew (5) VLPA Sokoloff
Readings of selected texts in modern Hebrew with continuing emphasis on grammar, syntax, composition, and conversation. Prerequisite: HEBR 422.

HEBR 426 Biblical Hebrew Prose (5) VLPA Noegel
Explores select prose sections of the Hebrew Bible (Old Testament) in conjunction with English translations and commentaries. Emphasis on close readings, the grammatical insights of textual criticism, and the interpretive strategies and agendas of the English translations. Prerequisite: HEBR 332 or HEBR 415.

HEBR 427 Biblical Hebrew Poetry (5) VLPA Noegel
Explores select poetic sections of the Hebrew Bible (Old Testament) in conjunction with English translations and commentaries. Emphasis on close readings, the grammatical insights of textual criticism, and the interpretive strategies and agendas of the English translations. Prerequisite: HEBR 333 or HEBR 426.

HEBR 428 Inscriptions from Biblical Times (5) VLPA Noegel
Surveys Northwest Semitic inscriptions that bear significantly on our understanding of Biblical history and ancient Hebrew including the Moabite stone, Israelite ostraca, Siloam engraving, Gezer calendar, Deir Alla (Gilead) inscriptions, the Asherah texts, Ammonite fragments, and Phoenician monuments. Prerequisite: HEBR 333 or HEBR 426.

HEBR 431 The Book of Job(5) VLPA Noegel
Examines the language, style, and sophistication of the biblical Book of Job within the context of ancient Near Eastern dispute poetry. Correlates close readings of the book in the original Hebrew language with various interpretations it has received since antiquity. Prerequisite: HEBR 426. Offered: A.

HEBR 432 The Book of Proverbs (5) VLPA Noegel
Examines the language, style, and sophistication of the biblical Book of Proverbs within the context of ancient Near Eastern dispute poetry. Correlates close readings of the book in the original Hebrew language with various interpretations it has received since antiquity. Prerequisite: HEBR 426. Offered: W.

HEBR 433 The Book of Ecclesiastes (5) VLPA Noegel
Examines the language, style, and sophistication of the biblical Book of Ecclesiastes within the context of ancient Near Eastern dispute poetry. Correlates close readings of the book in the original Hebrew language with various interpretations it has received since antiquity. Prerequisite: HEBR 426. Offered: A.

HEBR 451 Introduction to Hebrew Literature (3) VLPA Sokoloff
Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical

passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 452 Introduction to Hebrew Literature (3) VLPA Sokoloff
Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 453 Introduction to Hebrew Literature (3) VLPA Sokoloff
Literary texts and analysis. Grammar, composition, and dictionary skills. Primarily modern texts-short poetry, fiction, and essays-with some selections as well from biblical passages, the liturgy, midrash, and medieval poetry. Prerequisite: HEBR 423.

HEBR 454 Hebrew Poetry (3) VLPA Sokoloff
Selections of poetry by prominent twentieth-century Hebrew poets whose texts comment or elaborate on biblical texts. Original source considered side-by-side with modern poetry, to examine ways recent literature models itself on, draws upon, and revises traditional sources. Prerequisite: HEBR 423.

HEBR 455 Hebrew Fiction (3) VLPA Sokoloff
Selections of fiction by prominent modern Hebrew writers, including S.Y. Agnon, Aharon Appelfeld, David Shahar, Aharon Megged, and others. Prerequisite: HEBR 423.

HEBR 456 Hebrew Poems and Prayers (3) VLPA Sokoloff
Examines modern Hebrew poems side by side with texts from the traditional Jewish liturgy, analyzing how contemporary writers have drawn on classical sources to reflect on matters of faith and the language of prayer. Prerequisite: HEBR 423.

HEBR 457 Hebrew in Song (3) VLPA Sokoloff
Selections of Israeli folksong, pop, rock, children's songs, and musika mizrahit. While building vocabulary and improving dictionary and composition skills, students examine the role of popular song in the construction of modern Hebrew culture and Israeli identity.

HEBR 470 Stories of the Prophets (3) I&S/ VLPA
Reading and discussion of Jewish and Islamic exegesis of selected Biblical and Quranic narratives dealing with such figures as Moses, Abraham, Jacob, or Adam and Eve. Prerequisite: either ARAB 432 or HEBR 423. Offered: jointly with ARAB 470.

HEBR 472 Quran and Bible Masorah (3) VLPA
Introduces and discusses selected readings in textual apparatuses for the Quran and Bible. Attention to marginalia in Rabbinic texts, and Islamic scholars such as al-Zarkashi and as-Suyuti. Prerequisite: either ARAB 437, HEBR 427, or HEBR 432. Offered: jointly with ARAB 472.

HEBR 490 Supervised Study (1-6, max. 18)
Special work in literary texts for graduates and undergraduates. Prerequisite: HEBR 423.

HEBR 499 Undergraduate Research (1-6, max. 18) .

HEBR 600 Independent Study or Research (*).

Near Eastern Languages and Civilization

NEAR E 205 Religion, Violence, and Peace: Patterns Across Time and Tradition (5) I&S *Noegel, Wellman* Investigates the complex relationship between violence and peace in a variety of religious traditions. Examines case studies from the ancient Near East, medieval East Asia, and the contemporary West from the standpoint of lived experiences and contemporary theories derived from several academic disciplines. Offered: jointly with HUM/RELIG 205; W.

NEAR E 210 Introduction to Islamic Civilization (5) I&S/VLPA Major developments in Islamic civilization from advent of Islam in seventh century to present. Islamic history, law, theology, and mysticism, as well as the politics, cultures, and literatures of the various Islamic societies. Offered: jointly with SISME 210.

NEAR E 211 Islam (5) I&S/VLPA Introduction to important cultural and historical aspects of Islam, focusing on basic concepts and developments such as prophethood, Quran and Hadith, canon and law, ritual, social theory, Sufism, theology, and sectarianism. Special attention to comparison of varied Muslim practices and beliefs, and their relation to textual and personal authority. Offered: jointly with RELIG 211.

NEAR E 212 Introduction to the Quran (5) I&S/VLPA Emphasis on the historical context of the Quran, the history of the text, its collection, organization, and interpretation. In English. Offered: jointly with RELIG 212.

NEAR E 213 Introduction to the Modern Middle East (5) I&S Major social and political trends in the Middle East during the 18th, 19th, and 20th centuries. Basic principles of Islam and its diversity, changing balance of power during the early modern period; European colonialism and withdrawal; pan-Arabism, nationalism, feminism and religious resurgence. Offered: jointly with SISME 213.

NEAR E 215 Prophets in Islam and Judaism (5) I&S/VLPA *Noegel* Explores prophecy and prophets within the context of the ancient Mediterranean world. Particular attention to the exegetical traditions concerning prophets in the Bible and Quran. Examines the stories of Abraham, Moses, Gideon, Elijah/Khidr, and others. Prophecy and mysticism examined for their relationship to oracles, sufism, and sacred texts. Offered: Sp.

NEAR E 220 Introduction to the Ancient Near East (5) I&S/VLPA *Noegel* Surveys the peoples, places and events of the ancient Near East. Examines the cultures of Mesopotamia, Egypt, Canaan, and Israel with an eye to each culture's cultural contributions. Pays special attention to shared cultural elements as well as distinguishing characteristics of the peoples of these regions.

NEAR E 221 Digital Egypt (3) I&S/VLPA Uses technology to explore themes surrounding the study of Egypt, from ancient times through the early Islamic period. Intended as a broad interdisciplinary introduction to Egypt's history and cultural legacy.

NEAR E 230 Themes in Near Eastern Literature (5) VLPA, I&S Significant and interesting aspects of Near Eastern culture and

society as represented by literary themes. Aspects of Near Eastern life and art such as women, minority groups, mysticism, and modern literature. Content varies.

NEAR E 240 Introduction to the Hebrew Bible: Old Testament (5) I&S/VLPA Examines the Hebrew Bible (Old Testament) in translation and its relationship with literatures of ancient Near East. Comparisons drawn between biblical text and literary works of Canaan, Egypt, Greece, Mesopotamia. Emphasis on the sophisticated literary techniques employed by biblical writers. Offered: jointly with RELIG 240.

NEAR E 242 Cultural History of Turkey: From Empire to Nation (5) I&S/VLPA Topics include: social, economic, and political structures of Ottoman and Turkish Anatolia; language, literature, and artistic tradition; social status of women, literacy and illiteracy, the secular enterprise of Kemal Ataturk; Islamic fundamentalism, educational institutions, Kurdish nationalism. Offered: W.

NEAR E 250 Iranian Culture and Civilization (5) I&S/VLPA Explores the culture and civilization of this Middle Eastern society through a multidisciplinary approach that includes such manifestations as architecture, carpet-weaving, story-telling, and the composition of poetry.

NEAR E 251 Jewish Life in Literature and Film (3) I&S/VLPA Major themes of Jewish life treated in modern narrative and cinema. Topics include religious tradition and modernity. Jewish immigration to America, responses to the Holocaust and Zionism.

NEAR E 260 The Middle East in Film (3) I&S/VLPA The cinema of Egypt, Iran, Israel, Turkey, and other Middle Eastern nations; compares and contrasts the films with Middle Eastern literature from the twentieth century. Both films and literature illustrate how Middle Easterners view the world: their concepts of self versus society, religion, art, and politics.

NEAR E 310 Modern Near Eastern Literatures in English Translation (3) VLPA Contemporary cultures of the Middle East studied through exposure to a representative sample of their literary work. Texts selected address major issues in Middle Eastern societies, e.g. tradition versus modernity, national identity and the challenge of the West, Arab-Israeli conflict.

NEAR E 325 Modern Hebrew Literature in English (3) VLPA *Sokoloff* Major developments in Hebrew literature from the Enlightenment to the current Israeli literature. .

NEAR E 326 Israeli Identities (5) VLPA *Sokoloff* Examines fiction and film, as well as selected poetry, popular songs, and essays, to explore diverse groups within contemporary Israeli society. Topics include the sabra ideal, holocaust survivors, Sephardic/Mizrahi communities, religious and secular Jews, Israel's Arab minority, and questions of gender.

NEAR E 350 The City of Cairo (3) I&S/VLPA Development of Fustat and Cairo, 600-1800, with special emphasis on art and architecture. Consideration of the economic, social, and geographical influences on the creation of the distinctive Egyptian styles of Islamic art. Offered: jointly with ART H 350.

NEAR E 363 Oral Literature of the Turkic Peoples of Central Asia I: the Heroic Epos (3)

VLPA *Cirtautas* Representative heroic poems of Central Asian Turkic peoples now living in the Central Asian Republics and China. Origin of the heroic epos, its relation to the romantic epos and other oral literary genres. Art of the singer and his role in nomadic Turkic society. Emphasis on *Manas*, the monumental epos of Kirghiz. Offered: jointly with TKIC 363.

NEAR E 375 Turkic Peoples of Central Asia (3) I&S *Cirtautas* History of the Turkic peoples, AD 552 to present. Emphasis on current status of Turkic peoples in Central Asia. Geographical distribution, demographic data, reactions and adaptations to changes resulting from the 1917 revolution. Turkic viewpoint on past and present developments. Offered: jointly with SIS 377.

NEAR E 402 Classical Arabic Literature in Translation (3) VLPA *DeYoung* Examines development of Arabic literature from its beginnings through the fall of the Abbasid dynasty to the Mongols. Coincides with period when Arabic language and literature were dominant forces in Islamic civilization. Topics include: impact of Islam on the literature, courtly love, mystical poetry, the Thousand-and-One Nights, and Hispano-Arabic literature.

NEAR E 403 Colonialism, Nationalism, and the Modern Arabic Novel (3) I&S/VLPA *DeYoung* Examines how representative novels from the modern canon in Arabic have both endorsed and critiqued aspects of nationalism and colonialist ideology. Recommended: NEAR E 210.

NEAR E 420 Islamic Theological Literature in English (3) VLPA Readings from Mu'tazilite and Ash'arite works and from traditionalist works opposed to theology.

NEAR E 421 Islamic Mystical Literature in English (3) VLPA Readings from the works of principal Sufi writers and poets.

NEAR E 422 Islamic Philosophical and Scientific Literature in English (3) VLPA Readings in philosophy, the physical sciences, and medicine.

NEAR E 423 Persian Literature in Translation (3) VLPA Designed to familiarize students with an expanding collection of works translated from Persian literature, both classical and modern, into English. Focuses on a few representative texts and offers interpretations of the culture through close readings. Prior acquaintance with Iranian culture not required.

NEAR E 425 Current Trends in Modern Near Eastern Literature and Criticism (3) VLPA Modern literary tradition of the Near East with emphasis on major literary movements and/or genres and literary criticism in the modern period. The literatures of the Arab world, Persia, Turkey, and Israel are considered in alternate quarters.

NEAR E 430 Scripture and Law in Islam (5) I&S/VLPA Examines concept and use of scripture in Islam, with special attention to issues of canon and commentary, heavenly books, talismanic uses, and the place of scripture in ritual. In English. Offered: jointly with RELIG 430.

NEAR E 432 Ritual and Territory in Islam (5) I&S/VLPA Comparative study of Islamic ritual practices and related development of jurisprudence and law. Focus on sacrifice, political and social legal theory, pilgrimage, regulation of the

body, and the diversity of contemporary practices. In English. Offered: jointly with RELIG 432.

NEAR E 433 Life of Prophet Muhammad (5) I&S/VLPA Examines historical and religious traditions associated with the life of the Prophet Muhammad with particular attention to the biography in classical Islam. Focuses on Muhammad as prophet, holy man, law-giver, mystic, and statesman. Comparison with other religious figures such as Jesus and the Buddha. In English. Offered: jointly with RELIG 433.

NEAR E 435 Major Trends in Modern Arabic Fiction (3) VLPA *DeYoung* Development of Arabic prose fiction from the end of the nineteenth century to the present.

NEAR E 436 Arab American Writers (3) I&S/VLPA *DeYoung* Explores the influence of Arab American writing both in the United States and the Arab world during the nineteenth and twentieth centuries. Discusses issues of emigration to the United States from the Arab world and its impact on the formation of a distinctive Arab American identity.

NEAR E 437 Thousand and One Nights (3) VLPA *DeYoung* An examination of the major story cycles of the Thousand and One Nights collection, in its social and historical context.

NEAR E 440 Calligraphy in Islamic Culture (3) VLPA Survey of the esthetics, uses, interpretations of artistic writing in Islamic culture with a "hands on" approach to recognizing, appreciating, and creating Arabic script calligraphy. Students need not know Arabic script nor have calligraphic talents, although some familiarity with Islamic civilization is helpful.

NEAR E 442 Turkish Literature in Translation (3) VLPA Covers major theoretical issues concerning Ottoman court literature and Turkish epic and troubadour poetry. Major writers and works of modern Turkish literature read and analyzed in their social, political, and theoretical contexts. Previous study of Turkish literature not required.

NEAR E 443 The Word and the Empire: Reading Ottoman Literature (3-5) I&S/VLPA *Kuru* Approaches Ottoman literature through translations and scholarly articles in English. Evaluates this particular literary tradition as an imperial production, through an analysis and critical reading of course materials.

NEAR E 450 Survey of the Cultures of the Turkic Peoples of Central Asia (3) I&S/VLPA *Cirtautas* Nomadic and sedentary cultures of the Turkic peoples of Central Asia. Emphasis on language, literature, and adherence to traditional modes of life. Offered: jointly with SISRE 450.

NEAR E 451 Pharaonic Egypt in the Context of the Ancient Near East (3) I&S/VLPA *Noegel* Surveys the history, literature, and archaeology of ancient Egypt from the first pharaohs to the conquest of Alexander the Great. Introduces the field of Egyptology, and focuses on the continuity of Egyptian history and culture in context. Slide presentations supplement the readings and in-class lectures.

NEAR E 452 The Biblical Song of Songs (3) VLPA *Noegel* Examines the erotic and beautiful Song of Songs within the context of ancient (and medieval) Near Eastern love poetry and correlates close readings of the book with

various interpretations it has received from antiquity until today. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 452.

NEAR E 453 The Biblical Prophets (3) I&S/VLPA *Noegel* Explores the biblical prophets (in translation) within their Near Eastern contexts. Studies them for their historicity, literary and rhetorical sophistication, and ideological agendas. This course seeks to uncover the meaning and distinctiveness of Israelite prophecy within the context of the larger Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 453.

NEAR E 454 Israel: The First Six Centuries BCE (3) I&S/VLPA *Noegel* Traces the Israelites, from the Babylonian destruction of the Jerusalemite Temple (586 BCE) to events following the destruction of the second Temple (1st century CE). Focuses on primary historical and literary sources as well as archaeological and artistic evidence. No knowledge of Hebrew or the Bible is required. Offered: jointly with SISJE 454.

NEAR E 455 The Kings of Monarchic Israel (3) I&S/VLPA *Noegel* Examines the biblical accounts (in translation) concerning the formation and collapse of the united Israelite monarchy. Investigates the archaeological and textual evidence for their historicity, the literary sophistication of these accounts, and Israelite kingship within the wider context of the ancient Near East. No knowledge of the Bible is required. Offered: jointly with SISJE 455.

NEAR E 456 Women in Ancient Judaism (3) I&S/VLPA *Noegel* Explores those texts in early Jewish literature in which women play prominent roles and those in which women are surprisingly absent. Discusses the literary portrayal of women for what they tell us about the people who wrote the texts. No knowledge of Hebrew is required. Offered: jointly with RELIG 456.

NEAR E 457 The History of Biblical Interpretation (3) I&S/VLPA *Noegel* Traces biblical interpretation and translation technique from the earliest translations of the Hebrew Bible (Old Testament) to the various historical literary, deconstructionist, and holistic strategies of more recent times. Adopts a "hands-on" approach to the material and explores various hermeneutics by applying them in class. Offered: jointly with RELIG 457.

NEAR E 490 Supervised Study (1-6, max. 18) Special work in Near Eastern studies for graduates and undergraduates.

NEAR E 495 Trends in the Contemporary Middle East (3) I&S *Bacharach, De Young* Perspectives on cultural, political, and other aspects of Middle Eastern societies. Focuses on background complexities rather than immediate political-military confrontations. Topics vary. Offered: jointly with SISME 495.

NEAR E 496 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15) VLPA Offered occasionally by visitors or resident faculty. Content varies.

NEAR E 498 Senior Essay (5) I&S/VLPA Supervised individual research and writing of a major paper during the senior year. Offered: AWSp.

NEAR E 499 Undergraduate Research (1-6, max. 18) .

NEAR E 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/SCAND 518/SLAV 518.

NEAR E 520 Seminar on Near Eastern Civilization and Thought (3, max. 27) Content varies.

NEAR E 521 Research Methods (3) Introduction to research in Islamic civilization. Research methods, primary sources, evidence and documentation, reference works, transliteration systems, scholarly writing style.

NEAR E 522 Islamic Theology (3) Various schools of Islamic theology.

NEAR E 523 Islamic Philosophy (3) Various topics and problems dealt with by the Islamic philosophers.

NEAR E 524 Islamic Law (3) Selected topics in Islamic law that highlight major aspects of Islamic civilization. Offered: jointly with LAW B 556.

NEAR E 525 Islamic Institutions (3) Islamic institutions of the caliphate, the sultanate, the bureaucracy, taxation, mosques, and madrasahs, as well as theories of government.

NEAR E 530 Seminar on Near Eastern Literature (3, max. 27) Prerequisite: reading knowledge of at least one Near Eastern language. Content varies.

NEAR E 531 Proseminar in Literary Analysis (3, max. 9) Introduction to the theory and techniques of the study of literature in general and Near Eastern literatures in particular. Content varies. Prerequisite: reading knowledge of at least one Near Eastern language.

NEAR E 532 Theory and Practice in Modern Near Eastern Literature (3) Application of literary theory to works of modern Near Eastern literature. Concentrates on one major theory each year. Content varies.

NEAR E 533 Islamic Poetry and Poetics (3) Detailed introduction to prosody and rhyme in classical Arabic and Persian, followed by critical analysis of selected texts. Prerequisite: advanced level of Arabic or Persian; some knowledge of the other recommended.

NEAR E 595 Modern Methods and Materials in Teaching Near Eastern Languages (3) *Elkhafaiji* Theory and practice of communicative language teaching; current developments in foreign-language teaching; evaluation of teaching materials; includes participation at the departmental and university-wide fall orientation; required for beginning teaching assistants of Near Eastern languages; requires enrollment in Near E 518. Credit/no credit only. Offered: A.

NEAR E 596 Special Studies in Near Eastern Languages and Civilization (3-5, max. 15) Offered occasionally by visitors or resident faculty. Content varies.

NEAR E 600 Independent Study or Research (*) .

Persian

PRSAN 401 Intensive Elementary Tajik (15)
Intensive study of grammar with oral and written drill and reading of selected texts in Tajik, the literary language spoken and written in the Central Asian Republic of Tajikistan. Offered: S.

PRSAN 404 Intensive Persian for Native Speakers (15) VLPA Enables students with a degree of proficiency in spoken Persian to read and write, to translate rudimentary texts, and to conceptualize the use of the formal style of composition. Reading, writing, and comprehension, particularly of handwritten manuscripts of the scribal tradition. Also covers calligraphy, translation, journalistic prose, and other facets of the language and the script. Offered: S.

PRSAN 411 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words.

PRSAN 412 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 411.

PRSAN 413 Elementary Persian (5) Conversation, pronunciation, and graded reading. Persian alphabet and basic sentence constructions. Offers rudimentary conversational and reading ability with a vocabulary of about two thousand words. Prerequisite: PRSAN 412.

PRSAN 421 Intermediate Persian (5) VLPA
Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 413.

PRSAN 422 Intermediate Persian (5) VLPA
Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 421.

PRSAN 423 Intermediate Persian (5) VLPA
Reading of simple texts with emphasis on reading and writing, conversation skills, grammar, and syntax. Builds a vocabulary of standard Persian in preparation for advanced reading and comprehension of literary texts. Prerequisite: PRSAN 422.

PRSAN 431 Advanced Persian (3) VLPA
Designed to improve reading and writing skills. Graded reading and writing and exposure to the writing system, textual history, newspaper reading, and translation. Cultural materials presented as appropriate. The art of calligraphy introduced. For students with a degree of proficiency in spoken Persian. Prerequisite: PRSAN 423.

PRSAN 432 Advanced Persian (3) VLPA
Designed to improve reading and writing skills. Graded reading and writing and exposure to the writing system, textual history, newspaper

reading, and translation. Cultural materials presented as appropriate. The art of calligraphy introduced. For students with a degree of proficiency in spoken Persian. Prerequisite: PRSAN 431.

PRSAN 433 Advanced Persian (3) VLPA
Designed to improve reading and writing skills. Graded reading and writing and exposure to the writing system, textual history, newspaper reading, and translation. Cultural materials presented as appropriate. The art of calligraphy introduced. For students with a degree of proficiency in spoken Persian. Prerequisite: PRSAN 432.

PRSAN 451 Introduction to Persian Literature (3) VLPA Selected texts from modern and classical Persian poetry and prose. Provides insights into Iranian culture and its past and present achievements in literature. Prepares the student for a more comprehensive and critical study of Persian literature. Prerequisite: PRSAN 423.

PRSAN 452 Modern Persian Literature: A Survey (3) VLPA Development of poetry and prose after Iran felt and absorbed the impact of Western cultures. Periods and genres. Works of such authors as Jamalzadeh, Hedayat, Dehkoda, Al-e Ahmad, Nima, Sepehri, and Forugh. Prerequisite: PRSAN 423.

PRSAN 453 Classical Persian Literature: A Survey (3) VLPA History of Persian literature from Rudaki to Hafiz. Studies epic, lyric, and mystic traditions placed in historical settings. Covers the most important genres such as the Qasida, the Ghazal, the *Ruba'i* and the *Masnavi*. Prerequisite: PRSAN 423.

PRSAN 454 The Epic Tradition in Iran (3) VLPA Focuses on the Shahnameh of Firdawsi: explores the ancient legends that gave rise to it and follows the fortunes of epic poetry after Firdawsi, touching on the rise, development, and decline of romance in classical Persian literature. Prerequisite: PRSAN 433.

PRSAN 455 The Persian Ghazal (3) VLPA The Ghazal as the leading medium for lyrical expression in classical Persian tradition. Follows this genre from conception to culmination in the poetry of Hafiz. Conventions and devices of the *Ghazal*. Development placed in historical and social context. Prerequisite: PRSAN 433.

PRSAN 456 Sufism: Thought and Expression (3) I&S/VLPA Dynamics of mystical thought and expression as evolved in the writings of the great Sufi masters and reflected in the poetry of Sana'i, Attar, Rumi, and others. The fundamental unity of the mystical vision, with special attention to the peculiarities of individual style and expression. Prerequisite: PRSAN 433.

PRSAN 490 Supervised Study (1-6, max. 18)
Special work in literary texts for graduates and undergraduates. Prerequisite: PRSAN 423.

PRSAN 499 Undergraduate Research (1-6, max. 18) .

PRSAN 600 Independent Study or Research (*) .

Turkic

TKIC 401 Intensive Elementary Uzbek (15)
Intensive study of grammar, with oral and written drill and reading of simple texts in Uzbek. Covers

first-year Uzbek. Cannot be taken for credit if 411, 412, 413 taken. Offered: S.

TKIC 402 Intensive Elementary Kazakh (15)
Intensive study of grammar, with oral and written drill and reading of simple texts in Kazakh. Covers first-year Kazakh. Cannot be taken for credit if 414, 415, 416 taken. Offered: S.

TKIC 403 Intensive Elementary Kirghiz (15)
Intensive study of grammar with oral and written drill of selected texts. Offered: S.

TKIC 404 Intensive Intermediate Uzbek (15) VLPA Allows students to complete second-year Uzbek in one quarter. Reading of selected texts in Uzbek, with continuing emphasis on oral and written practice, grammar, and advanced readings. Cannot be taken for credit if 421, 422, 423 taken. Prerequisite: either TKIC 401 or TKIC 413. Offered: S.

TKIC 405 Intensive Intermediate Kazakh (15) VLPA Allows students to complete second-year Kazakh in one quarter. Reading of selected texts in modern literary Kazakh, with emphasis on grammar, syntax, and oral practice. Prerequisite: either TKIC 402 or TKIC 416. Offered: S.

TKIC 406 Intensive Advanced Uzbek (15) VLPA Advanced-level instruction in speaking, writing, reading, and listening skills. Students work independently on translation projects. Emphasis on extensive writing practices in Uzbek and student participation in an Uzbek email conversation circle. Prerequisite: TKIC 423. Offered: S.

TKIC 407 Intensive Elementary Uighur (15) VLPA Covers all four linguistic skills: reading, writing, speaking, and listening. Offered: S.

TKIC 411 Elementary Uzbek (5) Cirtautas
Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 412 Elementary Uzbek (5) Cirtautas
Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 413 Elementary Uzbek (5) Cirtautas
Introduction to the modern written and spoken language. Cannot be taken for credit if 401 taken.

TKIC 414 Introduction to Kazakh (3) Cirtautas
Position of Kazakh within the community of other Turkic languages; alphabets used for Kazakh; reading of texts from Kazakhstan and China (Xinjiang); oral and written exercises. Cannot be taken for credit if 402 taken.

TKIC 415 Introduction to Kazakh (3) Cirtautas
Position of Kazakh within the community of other Turkic languages; alphabets used for Kazakh; reading of texts from Kazakhstan and China (Xinjiang); oral and written exercises. Cannot be taken for credit if 402 taken.

TKIC 416 Introduction to Kazakh (3) Cirtautas
Position of Kazakh within the community of other Turkic languages; alphabets used for Kazakh; reading of texts from Kazakhstan and China (Xinjiang); oral and written exercises. Cannot be taken for credit if 402 taken.

TKIC 417 Introduction to Uighur (5) Cirtautas
Designed for students with no prior knowledge of Uighur. Includes acquisition of Uighur Arabic

alphabet, general phonological rules, and basic grammar. Basic reading, listening, and oral comprehension practice all offered throughout the course. Offered: A.

TKIC 418 Introduction to Uighur (5) *Cirtautas* Continuation of basic modern Uighur: phonological rules, grammar, and vocabulary. Practice in reading, listening, and oral comprehension. Prerequisite: TKIC 417. Offered: W.

TKIC 419 Introduction to Uighur (5) *Cirtautas* Continuation of basic modern Uighur: phonological rules, grammar, and vocabulary. Practice in reading, listening, and oral comprehension. Prerequisite: TKIC 418. Offered: Sp.

TKIC 421 Intermediate Uzbek (3) VLPA *Cirtautas* Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: either TKIC 401 or TKIC 413.

TKIC 422 Intermediate Uzbek (3) VLPA *Cirtautas* Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 421.

TKIC 423 Intermediate Uzbek (3) VLPA *Cirtautas* Continuation of elementary Uzbek. Oral work, grammar, and readings in Uzbek literature. Prerequisite: TKIC 422.

TKIC 451 Introduction to Turkic Studies (3) VLPA *Cirtautas* Bibliography, problems, and methods of research in the field of Turkic studies for advanced students of Turkish/Turkic languages, including readings in those languages on the languages, literatures, and ethnography of past and present Turkic peoples.

TKIC 454 Introduction to Uzbek Literature (3) VLPA *Cirtautas* Readings from selected Uzbek writers. Content varies.

TKIC 455 Introduction to Uzbek Literature (3) VLPA *Cirtautas* Readings from selected Uzbek writers. Content varies.

TKIC 456 Introduction to Uzbek Literature (3) VLPA *Cirtautas* Readings from selected Uzbek writers. Content varies.

TKIC 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: either TKIC 404, TKIC 405, or TKIC 423.

TKIC 499 Undergraduate Research (3-5, max. 15) For Turkic language and literature majors.

TKIC 542 Comparative and Historical Grammar of Turkic Languages (3) *Cirtautas* Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisite: TKIC 404.

TKIC 543 Comparative and Historical Grammar of Turkic Languages (3) *Cirtautas* Classification of the Turkic languages; alphabets used; phonology, morphology, and syntax; lexical composition; structure changing developments. Prerequisite: TKIC 404.

TKIC 546 Old Turkic (3) *Cirtautas* Introduction to Runic script; phonology, morphology, and syntax of the oldest form of Turkic; reading and translation of eighth-century inscriptions of historical and literary importance. Prerequisite: permission of instructor.

TKIC 547 Old Uighur (3) *Cirtautas* Introduction to script systems; phonology, morphology, and syntax. Reading and translation of mainly Buddhist texts in Uighur script, eighth through eleventh centuries. Prerequisite: background in a Turkic language or permission of instructor.

TKIC 561 Middle Turkic (3) *Cirtautas* Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid, Khorazmian Turkic, Kipchak, and Chagatai. Prerequisite: permission of instructor.

TKIC 562 Middle Turkic (3) *Cirtautas* Introduction to the phonology, morphology, and syntax of the Middle Turkic languages; reading and translation of texts in Karakhanid, Khorazmian Turkic, Kipchak, and Chagatai. Prerequisite: permission of instructor.

TKIC 563 Seminar on Turkic Literature (5) *Cirtautas* Topics in oral and written literature. Prerequisite: permission of instructor.

TKIC 600 Independent Study or Research (*) .

Turkish

TKISH 411 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.)

TKISH 412 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.) Prerequisite: TKISH 411.

TKISH 413 Elementary Turkish (5) Introduction to modern Turkish. Pronunciation and conversation, grammar and composition, graded reading. Latin characters used throughout. (Cannot be taken for credit if TKISH 401 is taken.) Prerequisite: TKISH 412.

TKISH 421 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 413.

TKISH 422 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 421.

TKISH 423 Intermediate Turkish (5) VLPA Introduction to modern Turkish literature. Prerequisite: TKISH 422.

TKISH 451 Readings in Turkish Literary History I: Modern (3) VLPA *Kuru* The development of modern Turkish literature and its ties to, and divergence from, the Ottoman tradition. Readings in modern and Tanzimat poetry, short story, drama, and novel.

TKISH 452 Readings in Turkish Literary History II: Literature of the Ottoman Empire (3) VLPA *Kuru* The parallel development of the classical high-culture literature and the popular literatures of the Ottoman Empire. Readings in poetry, history, travel-literature, drama, and popular narrative forms. Prerequisite: TKISH 423.

TKISH 453 Ottoman Travelers and Geography (3) VLPA *MacKay* Introduction to the geographic literature of Ottoman Turkish: readings from traditional cosmographies, travel journals, sailing

instructions (portulans), ambassadorial and secret service reports. Prerequisite: TKISH 456.

TKISH 454 Turkish Literary Genres: Prose (3) VLPA Major genres, styles, and themes of Turkish art-prose from Ottoman times to present; creation of stylistic and critical norms. Prerequisite: TKISH 423.

TKISH 455 Turkish Literary Genres: Poetry (3) VLPA Poetic traditions of Turkey with a focus on the development of peculiarly Turkish aspects of style and structure. Social functions of poetry and the poetic milieu. Prerequisite: TKISH 423.

TKISH 456 Introduction to Ottoman Turkish (3) VLPA *Kuru* Introduction to Turkish in Arabic characters to cover the peculiar grammatical and syntactical problems of Ottoman.

TKISH 490 Supervised Study (1-6, max. 18) Special work in literary texts for graduates and undergraduates. Prerequisite: TKISH 423.

TKISH 499 Undergraduate Research (1-6, max. 18) .

TKISH 600 Independent Study or Research (*)

Neurobiology

NBIO 301 Introduction to Cellular and Molecular Neurobiology (5) NW *Moody* Introduces students to the physiological and molecular properties of individual nerve cells and the synaptic connections between them, and to principles of nervous system development. Includes weekly laboratory sessions. Prerequisite: either BIOL 202 or BIOL 220. Offered: W.

NBIO 302 Introduction to Systems and Behavioral Neurobiology (5) NW *Kennedy, Perkel, Solis* Introduces neuroethology, i.e., the mechanisms by which neurons and the synaptic connections among them produce sensory perceptions and complex behavioral outputs. Includes weekly laboratory sessions. Prerequisite: NBIO 301. Offered: Sp.

NBIO 401 Systems Neurobiology (3) NW *Robinson* Introduces students to the anatomical and physiological organization of the major sensory, motor, and associative systems of the mammalian brain. Behavioral data used to stress functional integration of systems. Includes gross brain anatomy demonstration and computer tutorials. Prerequisite: NBIO 302. Offered: A.

NBIO 402 Neuropathophysiology (3) NW *Crill* Introduces students to the basic physiological mechanisms of information processing in the mammalian brain by having students study a series of human neurological diseases that result from a specific disruption of these mechanisms. Prerequisite: NBIO 401. Offered: W.

NBIO 403 Systems and Behavioral Neurobiology (3) NW Topics include information processing in sensory and motor systems, sensory-motor integration, learning, and memory. Using examples from the field of neuroethology, encourages students to independently work on problems taken from the recent neurobiological research literature. Prerequisite: NBIO 401. Offered: W.

NBIO 404 Neuropharmacology (3) NW *Stella* Actions of drugs on the brain at clinical, cellular, and molecular levels. Therapeutic use of drugs in treatment of neurological and psychiatric

diseases. Abuse of drugs and the mechanisms of addiction, tolerance, and withdrawal. Prerequisite: NBIO 401. Offered: Sp.

NBIO 440 Topics in Current Neurobiology Research (2, max. 6) NW Credit/no credit only. Prerequisite: NBIO 302.

NBIO 450 Current Research Literature in Neurobiology (2, max. 6) NW Weekly journal club in neurobiology. Students read and discuss original research articles in neurobiology, centered around a specific topic each quarter. Credit/no credit only. Prerequisite: either BIOL 202 or BIOL 220.

NBIO 496 Peer Teaching Assistant in Neurobiology (5) Direct classroom experience teaching in NBIO 301 or 302. Credit/no credit only. Prerequisite: NBIO 302. Offered: WSp.

NBIO 499 Individual Research in Neurobiology (3-6, max. 18) Students carry out projects in laboratories of program faculty. Prerequisite: NBIO 302.

Philosophy

PHIL 100 Introduction to Philosophy (5) I&S *BonJour, Rosenthal* Major philosophical questions relating to such matters as the existence of God, the foundations of knowledge, the nature of reality, and the nature of morality. Approach may be either historical or topical. Offered: AWSpS.

PHIL 102 Contemporary Moral Problems (5) I&S/VLPA *A. Moore* Philosophical consideration of some of the main moral problems of modern society and civilization, such as abortion, euthanasia, war, and capital punishment. Topics vary.

PHIL 110 Introduction to Social and Political Philosophy (5) I&S *Clatterbaugh, Coburn* An introduction to political theories such as conservatism, liberalism, and socialism and their treatment of select social issues.

PHIL 114 Philosophical Issues in the Law (5) I&S *R. Moore* Analysis and critical assessment of various philosophical issues in law and legal reasoning. Material drawn from actual law cases, as well as writings by contemporary philosophers of law and lawyers. Topics include criminal responsibility, civil disobedience, abortion, enforcement of morals. Special legal or philosophical training not required.

PHIL 115 Practical Reasoning (5) I&S, QSR Introduction to logic emphasizing concepts and methods useful for practical analysis of arguments in everyday contexts; meaning, syllogisms, logical diagrams, inductive and statistical inference, informal fallacies, argument structure, perhaps some beginning symbolic logic. Offered: AWSpS.

PHIL 120 Introduction to Logic (5) I&S/NW, QSR *BonJour, Cohen, Fine, Keyt, Weller* Elementary symbolic logic. The development, application, and theoretical properties of an artificial symbolic language designed to provide a clear representation of the logical structure of deductive arguments. Offered: AWSpS.

PHIL 160 Why Do We Believe in Quarks, Evolution, and Other Crazy Things? Perspectives on Science, Reason, and Reality (5) I&S *Hankinson Nelson* Study of how scientific

theories are justified and why they are accepted, using selected examples from the history of science.

PHIL 199 New Majors Seminar (2) I&S/VLPA Introduces undergraduates to the field and to the interests of various faculty. Prerequisite: one previous PHIL course.

PHIL 200 Topics in Philosophy (3-5, max. 10) I&S A study of philosophical topics at the introductory level. The content of the course is entirely at the discretion of the instructor.

PHIL 206 Philosophy of Feminism (5) I&S Philosophical analysis of the concepts and assumptions central to feminism. Theoretical positions within the feminist movement; view of the ideal society, goals and strategies of the movement, intersections of the sex-gender system with other systems of oppression. Offered: jointly with POL S 212/WOMEN 206.

PHIL 230 Philosophic Issues in World Affairs (3) I&S *Coburn* Moral problems that arise in connection with such topics as affluence, hunger, and overpopulation; global environmental degradation; war and weaponry; restructuring the international order.

PHIL 240 Introduction to Ethics (5) I&S/VLPA *Roberts, Smith, Talbott* Critical introduction to various philosophical views of the basis and presuppositions of morality and moral knowledge. Critical introduction to various types of normative ethical theory, including utilitarian, deontological, and virtue theories.

PHIL 241 Topics in Ethics (5, max. 10) I&S/VLPA Introduction to ethics through in-depth study of one or more selected topics (e.g., limits of moral community, animal rights, moral education, and freedom). Topics vary.

PHIL 242 Introduction to Medical Ethics (5) I&S/VLPA *Goering* Introduction to ethics, primarily for first- and second-year students. Emphasizes philosophical thinking and writing through an in-depth study of philosophical issues arising in the practice of medicine. Examines the issues of medical ethics from a patient's point of view.

PHIL 267 Introduction to Philosophy of Religion (5) I&S *Clatterbaugh, Coburn* Consideration of the sources of religious ideas and practices, the main kinds of religious views and the problems they raise, and the different forms that spirituality can take. Issues concerning the relations of religion to science and morality also treated.

PHIL 301 Intermediate Topics in Philosophy (3-5, max. 10) I&S *Baker, Woody* Philosophical topics at the intermediate level. Content varies each quarter, depending on instructor.

PHIL 314 Philosophy of Crime and Punishment (5) I&S *R. Moore* Examination of philosophical theories regarding criminal habits and punishment and the philosophical problems connected with specific topics in criminal law. Examines proper subject matter of criminal law (drug use, pornography, euthanasia); limits of criminal sanctions; crime and privilege (corporate crime, white-collar crime, blackmail); justifications for punishment; mercy; and execution.

PHIL 320 Ancient Philosophy (5) I&S *Cohen, Keyt, Roberts, Weller* Survey of ancient Greek

philosophy, beginning with the pre-Socratics and proceeding on through Plato to Aristotle.

PHIL 321 Medieval Philosophy (5) I&S Development of main lines of philosophical thought in the Latin West from 400 to 1400, with emphasis on Augustine, Anselm, Abailard, Aquinas, and Ockham.

PHIL 322 Modern Philosophy (5) I&S *Baker, BonJour, Clatterbaugh, Coburn, Rosenthal, Weller* Examination of metaphysical and epistemological problems from the works of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.

PHIL 325 Nineteenth-Century Philosophy (5) I&S *Coburn* Examination of post-Kantian thinkers through the end of the nineteenth century considering such major themes as idealism, romanticism, positivism, historicism, naturalism, existentialism, and pragmatism.

PHIL 327 American Philosophy (5) I&S Study of some of the major American philosophers such as Peirce, Royce, Dewey, William James, C. I. Lewis, Goodman, Quine.

PHIL 330 History of Ancient Political Philosophy (5) I&S *Keyt, Roberts* Political philosophy of fourth- and fifth-century Greece, especially the Sophists, Plato, and Aristotle, stressing the connection between the political philosophy and the underlying philosophical system of each philosopher.

PHIL 332 History of Modern Political Philosophy (5) I&S *BonJour, Clatterbaugh, Talbott* Examination of major political philosophies from the sixteenth century to the nineteenth century, with attention to the underlying philosophical methods and foundations.

PHIL 334 Philosophy of Marxism (3) I&S *Clatterbaugh* Philosophy of Marx and the Marxist tradition with attention to key Marxist concepts such as exploitation, alienation, and historical materialism.

PHIL 335 Plato's Republic (5) I&S/VLPA *Keyt* Designed especially for philosophy majors, but open to non-majors. Intensive study of Plato's masterpiece. Prerequisite: one PHIL course.

PHIL 338 Philosophy of Human Rights (5) I&S *Talbott* Theories of human rights and the bearing of these theories on issues of public policy such as legitimacy of war and terrorism, economic justice, and whether future generations have rights.

PHIL 340 History of Ancient Ethics (5) I&S/VLPA *Keyt, Roberts* Development of moral thought from Socrates through the Stoics. Particular emphasis on the ethical writings of Plato and Aristotle.

PHIL 342 History of Modern Ethics (5) I&S/VLPA *Jecker, Smith, Weller* Development of moral thought from Hobbes through Nietzsche, with particular emphasis on the ethical writings of Hume, Kant, and John Stuart Mill.

PHIL 344 History of Recent Ethics (5) I&S/VLPA Study of major ethical writings in the twentieth century, with principal emphasis on the Anglo-American tradition.

PHIL 345 Moral Issues of Life and Death (5) I&S/VLPA *Coburn, Goering* Examination of such

topics as war and murder, famine relief, capital punishment, high-risk technologies, abortion, suicide, and the rights of future generations.

PHIL 346 Personal Values and Human Good (3) I&S *Baker, Coburn, Goering, Smith* Examination of the idea of a good human life. Emphases differ from year to year. Typical topics include happiness and prudence, rationality and life plans, personal values and the meaning of life, autonomy and false consciousness, self-respect and self-esteem, honesty and self-deception, faith and "vital lies."

PHIL 347 Philosophy in Literature (5) I&S/ VLPA Study of philosophical ideas expressed in works of literature.

PHIL 350 Introduction to Epistemology (4) I&S *Baker, BonJour, Talbott* Nature, definition, and possibility of knowledge.

PHIL 353 Introduction to the Philosophy of Language (5) I&S Philosophical theories about the nature of language. Topics include meaning, reference, truth, propositions, relations between language and thought.

PHIL 356 Introduction to Metaphysics (5) I&S *Baker* Introductory examination of some of the main problems in metaphysics, such as the nature of truth and reality, the metaphysical status of properties, the existence of free will.

PHIL 360 Introductory Topics in Philosophy of Science (5, max. 10) I&S *Fine, Hankinson Nelson, Woody* Study of one or more current topics in philosophy of science such as scientific realism, explanation, confirmation, causation. Prerequisite: one PHIL course; recommended: PHIL 120; PHIL 160.

PHIL 363 Introduction to the Philosophy of Mind (5) I&S Various theories of the nature of mind, the relationship between mind and body, the self, introspection, and knowledge of other minds.

PHIL 386 Introduction to the Philosophical Systems of India (5) I&S The fundamental views of classical Indian philosophical schools on epistemology and metaphysics through readings in translation of basic works. Nyaya, Vaisheshika, Samkhya, Yoga, Jain philosophy, Vijnanavada and Madhyamika Buddhism, Advaita Vedanta and later developments. Offered: jointly with SISSA 386.

PHIL 399 Foreign Study (2-5, max. 10) Upper division philosophy studies with no direct UW equivalents, taken through UW foreign study programs.

PHIL 401 Advanced Topics in Philosophy (3-5, max 10) I&S *Baker* A study of philosophical topics at the advanced level. Topics vary.

PHIL 406 Philosophical Topics in Feminism (5) I&S *Roberts, Hankinson Nelson, Woody* Detailed examination of questions raised by recent feminist scholarship in particular areas of philosophy, such as political theory, ethics, epistemology, or philosophy of science. Emphasis varies.

PHIL 410 Social Philosophy (5) I&S *Clatterbaugh, Coburn, Talbott* An examination of topics pertaining to social structures and institutions such as liberty, distributive justice, and human rights.

PHIL 411 Justice in Health Care (5) I&S/VLPA *Jecker* Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with MHE 474.

PHIL 414 Philosophy of Law (3) I&S *BonJour, A. Moore, R. Moore* Nature and function of law. Relation of law to morality. Legal rights, judicial reasoning.

PHIL 416 Ethics and Climate Change (5) I&S *Gardiner* Critical examination of the ethical issues surrounding climate change. Prerequisite: either one philosophy or one environmental studies course. Offered: jointly with ENVIR 416.

PHIL 422 Studies in Continental Rationalism (3, max. 9) I&S *Clatterbaugh, Coburn* Study of one or more of the major continental Rationalists: Descartes, Spinoza, Leibniz.

PHIL 425 Studies in Nineteenth-Century Philosophy (3) I&S *Baker* Study of post-Kantian metaphysical theories, with special emphasis on idealism, realism, and/or pragmatism. Typical authors include F. H. Bradley, J. McTaggart, Royce, and Green.

PHIL 426 Twentieth-Century Philosophy (5) I&S *Baker, Weller* A study of development of contemporary analytic philosophy, the revolt against idealism, and the linguistic turn in philosophy.

PHIL 430 Hellenistic Philosophy (3) I&S *Roberts* Survey of the Epicurean, Stoic, and Skeptic philosophy of the Hellenistic period. Emphasis may vary.

PHIL 431 Philosophy of Plato (3, max. 6) I&S *Cohen, Keyt, Roberts, Weller* Study of selected middle and late dialogues.

PHIL 433 Philosophy of Aristotle (3, max. 6) I&S *Cohen, Keyt, Roberts, Weller* Study of several major Aristotelian treatises.

PHIL 434 Philosophy of Thomas Aquinas (3) I&S Examination of the major philosophical positions of Thomas Aquinas in the theory of knowledge, metaphysics, and ethics.

PHIL 436 British Empiricism (3) I&S *BonJour* Examination of the metaphysical and epistemological views of Locke and Berkeley, with perhaps some attention also to Hume. Prerequisite: either PHIL 322 or PHIL 350.

PHIL 437 Philosophy of Hume (3) I&S *Marks, Weller* Study Hume's analyses of knowledge, the passions, and morals.

PHIL 438 Philosophy of Kant (5) I&S *BonJour, Weller* Systematic study of *The Critique of Pure Reason*.

PHIL 439 The Later Philosophy of Wittgenstein (3) I&S *Coburn* Detailed study of topics in the later philosophy of Wittgenstein, with particular attention to the *Philosophical Investigations*.

PHIL 440 Ethics (5) I&S *Coburn, Roberts, Smith, Talbott* Critical examination of the concepts and judgments of value, including an analytical treatment of the notions of good and bad, right and wrong, and obligation. Emphasis varies from quarter to quarter.

PHIL 443 Philosophy and Linguistics (3) I&S/ VLPA Study of philosophical problems that arise in the attempt to understand current linguistic theories and of the implications of linguistics for philosophy. Offered: jointly with LING 443.

PHIL 444 Philosophy of Language-Pragmatics (3) I&S/VLPA Language as communicative activity. Speech act theory in Austin, Grice, and contemporary writings. Applications to problems of reference, presupposition, metaphor, relativism. Offered: jointly with LING 444.

PHIL 445 Philosophy of Art (5) I&S/VLPA *R. Moore* Critical examination of various accounts of the nature of art, artistic activity, the aesthetic experience. Problems in interpretation and evaluation of works of art.

PHIL 446 Development of Aesthetic Theory (5) I&S/VLPA *R. Moore* Historical development of aesthetics, emphasizing such major figures as Plato, Aristotle, Hume, Kant, Hegel, and Goodman.

PHIL 447 Philosophy of Literature (3) I&S/ VLPA Investigation of philosophical questions about literature: What is literature? Must literature be interpreted? What is interpretation? Literature and ideology.

PHIL 450 Epistemology (5) I&S *Baker, BonJour, Talbott* Systematic study of some of the main problems of the theory of knowledge, such as: the definition of "knowledge;" a priori knowledge; perception and knowledge of the external world; and whether knowledge has or requires a foundation. Emphasis varies from quarter to quarter.

PHIL 453 Philosophy of Language (5) I&S/ VLPA Current theories of meaning, reference, predication, and related concepts. Offered: jointly with LING 476.

PHIL 456 Metaphysics (5) I&S *Baker, Coburn* Examination of such topics as freedom of the will, the nature of persons and personal identity, the existence of God, time, necessary truth, and universals. The emphases vary from year to year.

PHIL 458 Phenomenology (5) I&S The contributions of phenomenology to selected topics in the theory of meaning, philosophy of mind, ontology, and epistemology.

PHIL 459 Philosophy of Medicine (5) I&S *Jecker* Familiarizes students with central issues in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history of science, or history of medicine. Offered: jointly with MHE 440.

PHIL 460 Philosophy of Science (5) I&S/NW *Hankinson Nelson, Woody* Critical study of the nature of scientific knowledge. Topics include the relation of theory to observation, the use of mathematics, how theories change, the requirements for the meaningfulness of a theory, and nature of confirmation. Recommended: PHIL 120 or PHIL 160; prerequisite: one PHIL course.

PHIL 461 Philosophical Anthropology (5) I&S Investigation of the question, "What is human reality?" Philosophical significance of this question and its relation to the human sciences. Typical answers. Implications of those answers for culture, religion, morals, and politics.

PHIL 463 Philosophy of Mind (5) I&S *BonJour* Examination of current theories of the nature of the mind and mental processes.

PHIL 464 Philosophical Issues in the Cognitive Sciences (5) I&S/NW Philosophical problems connected with research in psychology, artificial intelligence, and other cognitive sciences. Topics vary. Readings from both philosophical and scientific literature. Accessible to nonphilosophers with suitable interests and backgrounds.

PHIL 465 Philosophy of History (3) I&S *Baker* Analyses of basic concepts employed in historical interpretation, and study of some of the principal philosophers of history, such as Plato, Saint Augustine, Hegel, Marx, Spengler, Toynbee.

PHIL 466 Philosophy of the Social Sciences (5) I&S *Hankinson Nelson, Talbott* Examination of fundamental issues in the foundations, methodology, and interpretation of the social sciences. Topics include value orientation and objectivity, methodological individualism, functionalism, reductionism, and the status of idealized models, including models involving idealized conceptions of individual rationality. Emphasis varies from quarter to quarter.

PHIL 467 Philosophy of Religion (5) I&S *Clatterbaugh, Rosenthal* Study of selected topics and problems in the philosophy of religion, such as: arguments for the existence of God; the problem of evil; atheism; faith; religious experience and revelation; the attributes of God; miracles; immortality; and the relation between religion and morality. Readings from historical and contemporary authors.

PHIL 469 Existentialist Philosophy (3) I&S Examination of major ideas of selected existentialist philosophers.

PHIL 470 Intermediate Logic (5) I&S/NW, QSR *Fine, Keyt* An introduction to the concepts and methods of metatheory and their application to the sentential calculus.

PHIL 471 Advanced Logic (5) I&S/NW *Keyt* Study of the first-order predicate calculus with identity and function symbols. Consistency, soundness, completeness, compactness. Skolem-Lowenheim theorem. Formalized theories. Prerequisite: PHIL 470.

PHIL 472 Axiomatic Set Theory (5) I&S/NW *Keyt, Townsend* Development of axiomatic set theory up to and including the consistency of the Axiom of Choice and Continuum Hypothesis with the Zermelo-Fraenkel Axioms.

PHIL 473 Philosophy of Mathematics (5) I&S/NW *Fine* Study of the traditional accounts of the nature of mathematical entities and mathematical truth given by logicism, intuitionism, and formalism, and the impact of Godel's incompleteness theorems on these accounts.

PHIL 474 Modal Logic (5) I&S/NW Notions of necessity and possibility, using the classical systems T, S4, and S5, and the syntax and the semantics (Kripke models) of these systems.

PHIL 479 Semantics II (3) I&S/NW/VLPA *Ogihara* Formal characterization of linguistic meaning. Emphasis on nature and purpose of formal semantics and on its relation to formal syntax. Prerequisite: LING 442. Offered: jointly with LING 479.

PHIL 481 Philosophy of Biology (5) I&S/NW *Hankinson Nelson* Study of several current topics in philosophy of biology, which may include the logical structure of evolutionary theory, fitness, taxonomy, the concept of a living thing, reductionism, the concept of a biological species, evolutionary explanations, and philosophical consequences of sociology. Recommended: college-level course in biological science; prerequisite: one PHIL course.

PHIL 482 Philosophy of Physical Science (5, max. 10) I&S/NW *Fine, Woody* Study of philosophical issues raised by theories in physics or chemistry, such as whether space (time) is a substance, how causation and locality are treated in quantum mechanics, temporal anisotropy and time travel, the nature of a field of force, the reduction of chemistry to physics. Prerequisite: one PHIL course.

PHIL 483 Induction and Probability (5) I&S/NW Introduction to current accounts of evidence and observation, the confirmation of scientific theories, the logic of inductive reasoning, and the metaphysics and epistemology of chance. High school-level math used. Specific topics vary from year to year. Prerequisite: PHIL 120.

PHIL 484 Reading in Philosophy (1-5, max. 15) Individual study of selected philosophical works.

PHIL 490 Advanced Topics in Epistemology (5, max. 15) I&S *BonJour, Talbott* Intensive study of a particular topic or area in epistemology. Prerequisite: either PHIL 350 or PHIL 450.

PHIL 498 Undergraduate Internship (1-5, max. 10) *Baker, Clatterbaugh* Independent fieldwork under the supervision of a faculty member. Individual experiences vary but could include an off-campus practicum or being trained as study group leader or tutor. Offered: A/WSp.

PHIL 500 Proseminar in Philosophy (5) Introduces incoming graduate students to topics representative of the field and the faculty's interest. Each class session is devoted to a separate topic taught by a different member of the faculty. In addition to reading and short written assignments. Students prepare a term paper on a topic presented. Offered: A.

PHIL 501 Foresight in Science and Technology: Choices and Consequences (3) Examination of the foresight (or lack of it) with which we practice science and use technology. Contrasts potential risks of various choices with potential benefits. Credit/no credit only. Offered: jointly with ENVIR 535/PHYS 535/ZOOL 523.

PHIL 505 Seminar in Teaching Philosophy (1, max. 10) *Baker* First quarter: seminar on topics of importance to a graduate student teaching two quiz sections of a large lecture course. Second quarter: focus on helping student prepare to teach own course. Prerequisite: graduate standing in philosophy. Offered: AW.

PHIL 510 Seminar in Social Philosophy (5, max. 20) *Talbott* .

PHIL 514 Seminar in Legal Philosophy (5, max. 20) *R. Moore* .

PHIL 520 Seminar in Ancient Philosophy (5, max. 20) *Cohen, Keyt, Roberts, Weller* .

PHIL 521 Seminar in Medieval Philosophy (5, max. 20) .

PHIL 522 Seminar in Modern Philosophy (5, max. 20) *Clatterbaugh, Weller* .

PHIL 525 Seminar in Nineteenth-Century Philosophy (5, max. 20) *Baker* .

PHIL 526 Seminar in Recent Philosophy (5, max. 20) *Keyt* .

PHIL 538 Philosophy of Human Rights (5, max. 20) *Talbott* .

PHIL 540 Seminar in Ethics (5, max. 20) *Coburn, Roberts, Smith, Talbott* .

PHIL 545 Seminar in the Philosophy of Art (5, max. 20) *Moore* .

PHIL 550 Seminar in Epistemology (5, max. 20) *BonJour, Talbott* .

PHIL 553 Seminar in Philosophy of Language (5, max. 20) .

PHIL 556 Seminar in Metaphysics (5, max. 20) *Baker, BonJour, Coburn* .

PHIL 560 Seminar in the Philosophy of Science (5, max. 20) *Fine, Woody* .

PHIL 563 Seminar in the Philosophy of Mind (5, max. 20) *BonJour* .

PHIL 566 Seminar in Philosophy of the Social Sciences (5, max. 20) .

PHIL 567 Seminar in the Philosophy of Religion (5, max. 20) *Coburn* .

PHIL 570 Seminar in Logic (5, max. 20) *Keyt* Prerequisite: PHIL 470.

PHIL 584 Reading in Philosophy (1-5, max. 12) Intensive reading in philosophical literature. Prerequisite: permission of graduate program coordinator.

PHIL 587 Contemporary Analytic Philosophy (5, max. 20) *Baker* .

PHIL 600 Independent Study or Research (*) Prerequisite: permission of graduate program coordinator.

PHIL 700 Master's Thesis (*) .

PHIL 800 Doctoral Dissertation (*) .

Physics

PHYS 101 Physical Science by Inquiry I (5-5) NW, QSR Laboratory-based development of concepts and reasoning skills. Helps prepare preservice teachers to teach science by inquiry. Liberal arts students gain experience in the scientific process. Useful for students with weak science preparation before taking standard science courses. Forms foundation for scientific literacy. Offered: AW.

PHYS 102 Physical Science by Inquiry I (-5) NW, QSR Laboratory-based development of concepts and reasoning skills. Helps prepare preservice teachers to teach science by inquiry. Liberal arts students gain experience in the scientific process. Useful for students with weak science preparation before taking standard science courses. Forms foundation for scientific literacy. Prerequisite: PHYS 101. Offered: Sp.

PHYS 103 Physical Science by Inquiry I (5) NW, QSR See PHYS 101-102. Prerequisite: PHYS 102.

PHYS 110 Liberal Arts Physics (5) NW, QSR Basic concepts of physics presented with emphasis on their origin and their impact on society and the Western intellectual tradition. Primarily for students in the arts, humanities, and social sciences. Offered: AS.

Credit is not given for both 114 and 121.

PHYS 114 General Physics (4) NW, QSR Basic principles of physics presented without use of calculus. Suitable for students majoring in technically oriented fields other than engineering or the physical sciences. Mechanics. Credit is not given for both 114 and 121. Recommended: working knowledge of algebra and trigonometry; one year high school physics; concurrent registration in PHYS 117. Offered: AWSpS.

Credit is not given for both 115 and 122.

PHYS 115 General Physics (4) NW, QSR Basic principles of physics presented without use of calculus. Suitable for students majoring in technically oriented fields other than engineering or the physical sciences. Heat and electromagnetism. Credit is not given for both 115 and 122. Prerequisite: PHYS 114 or 121; recommended: concurrent registration in PHYS 118. Offered: AWSpS.

Credit is not given for both 116 and 123.

PHYS 116 General Physics (4) NW, QSR Basic principles of physics presented without use of calculus. Suitable for students majoring in technically oriented fields other than engineering or the physical sciences. Sound, light, and modern physics. Credit is not given for both 116 and 123. Prerequisite: PHYS 115 or 122; recommended: concurrent registration in PHYS 119. Offered: AWSpS.

PHYS 117 General Physics Laboratory (1) NW Mechanics laboratory. Credit/no credit only. Credit is not given for both 117 and the 121 lab. Prerequisite: PHYS 114 which may be taken concurrently. Offered: AWSpS.

PHYS 118 General Physics Laboratory (1) NW Heat and electromagnetism laboratory. Credit/no credit only. Credit is not given for both 118 and the 122 lab. Prerequisite: PHYS 115 which may be taken concurrently. Offered: AWSpS.

PHYS 119 General Physics Laboratory (1) NW Sound, light, and modern physics laboratory. Credit/no credit only. Credit is not given for both 119 and the 123 lab. Prerequisite: PHYS 116 which may be taken concurrently. Offered: AWSpS.

The courses 121, 122, 123, 224, 225 plus appropriate laboratory together make up the general physics sequence for science and engineering students.

PHYS 121 Mechanics (0/5, max. 5) NW, QSR Basic principles of mechanics and experiments in mechanics for physical science and engineering majors. Lecture tutorial and lab components must all be taken to receive credit. Credit is not given for both 114 and 121. Prerequisite: MATH 124, MATH 127, MATH 134, or MATH 145, any of which may be taken concurrently; recommended: one year high school physics. Offered: AWSpS.

PHYS 122 Electromagnetism and Oscillatory Motion (0/5, max. 5) NW Basic principles of electromagnetism, the mechanics of oscillatory motion, and experiments in these topics for physical science and engineering majors. Lecture tutorial and lab components must all be taken to receive credit. Credit is not given for both 115 and 122. Prerequisite: MATH 125, MATH 128, MATH 134, or MATH 146, any of which may be taken concurrently; PHYS 121. Offered: AWSpS.

PHYS 123 Waves (0/5, max. 5) NW Electromagnetic waves, optics, waves in matter, and experiments in these topics for physical science and engineering majors. Lecture tutorial and lab components must all be taken to receive credit. Credit is not given for both 116 and 123. Prerequisite: MATH 126, MATH 129, or MATH 134, any of which may be taken concurrently; PHYS 122. Offered: AWSpS.

PHYS 204 Radiation: Nature, Technology, and Society (3) NW Introduction to the science and implications of nuclear physics and radiation for non-science students. Emphasis on qualitative rather than quantitative understanding. Physics of the nucleus, types of radiation, technological uses, and human exposure. Critical evaluation of current issues, including food irradiation, depleted uranium, nuclear power, and nuclear weapons.

PHYS 207 The Physics of Music (3) NW The nature of sound; vibrations; traveling and standing waves; response of the ear to sound; production of musical sounds.

PHYS 210 Physics by Inquiry I (5) NW Selected topics in physics with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics and physical science as a process of inquiry. Prerequisite: either PHYS 103, PHYS 116, or PHYS 123. Offered: A.

PHYS 211 Physics by Inquiry I (5) NW Selected topics in physics with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics and physical science as a process of inquiry. Prerequisite: PHYS 210. Offered: W.

PHYS 212 Physics by Inquiry I (5) NW Selected topics in physics with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics and physical science as a process of inquiry. Prerequisite: PHYS 211. Offered: Sp.

PHYS 214 Light and Color (5) NW, QSR Compares past explanation of certain familiar natural phenomena with present understandings. Lamps and lighting, outdoor light, optical devices, color vision, perspective, paints, and pigments. Quantitative comparison critical to the course, but college-level mathematics background not required. Intended for non-science students.

PHYS 215 A Way of Knowing (5) NW, QSR *Boynston* Insight to the character and culture of scientific inquiry through a historical examination of how we have interpreted our experience of the phenomena of gravitation. Specifically for non-science majors. Quantitative reasoning and critical thinking required, but no college-level mathematics.

PHYS 216 Science and Society (5) NW, QSR *Chaloupka* Investigation of the relationship between science, technology and society. Nuclear physics and molecular biology serves as concrete examples of fields with significant impact on society. Offered jointly with SIS 216; Sp.

PHYS 224 Thermal Physics (3) NW Introduction to heat, thermodynamics, elementary kinetic theory, and the physics of continuous media. Prerequisite: MATH 126, MATH 129, or MATH 136, any of which may be taken concurrently; PHYS 122 which may be taken concurrently. Offered: AWSpS.

PHYS 225 Modern Physics (3) NW Special theory of relativity; phenomena of modern physics with emphasis on photons, electrons, and atoms; introduction to quantum physics. Prerequisite: 2.0 in PHYS 123 which may be taken concurrently. Offered: AWSpS.

PHYS 227 Elementary Mathematical Physics (3) NW Applications of mathematics in physics with emphasis on the mechanics of particles and continuous systems. Prerequisite: either MATH 134, MATH 135, MATH 136, MATH 308, or MATH 318; 2.0 in PHYS 123. Offered: AS.

PHYS 228 Elementary Mathematical Physics (3) NW Applications of mathematics in physics with emphasis on the mechanics of particles and continuous systems. Prerequisite: PHYS 227. Offered: AW.

PHYS 231 Introductory Experimental Physics (3) NW Introduction to data acquisition and analysis using experiments which measure fundamental constants or properties of nature (Planck's constant, Boltzmann's constant, speed of light, charge of electron). Prerequisite: 2.0 in PHYS 123.

PHYS 232 Introduction to Computational Physics (3) Computational techniques applied to physics and data analysis in laboratory setting. Emphasis on numerical solutions of differential equations, least square data fitting, Monte Carlo methods, and Fourier Analysis. A high-level language taught and used; no previous computing experience required. Prerequisite: PHYS 227. Offered: Sp.

PHYS 311 Relativity and Gravitation (3) NW Special theory of relativity, Newtonian gravity, and relativistic effects of gravitation, including black holes, gravitational waves, and applications to cosmology. Prerequisite: 2.0 in PHYS 123.

PHYS 315 Applications of Modern Physics (3) Foundations of quantum physics, including Schrodinger equation, tunneling, atoms, spin, and applications. These include semiconductor devices, lasers, magnetic resonance imaging (MRI), quantum cryptography, atomic microscopes. Prerequisite: minimum grade of 2.0 in PHYS 224, minimum grade of 2.0 in PHYS 225, minimum grade of 2.0 in PHYS 227 which may be taken concurrently. Offered: W.

PHYS 321 Electromagnetism (4) NW First of a three-quarter sequence. Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics. Prerequisite: either MATH 324 which may be taken concurrently, MATH 334, MATH 335, or MATH 336; minimum grade of 2.0 in PHYS 228. Offered: AW.

PHYS 322 Electromagnetism (4) NW Continuation of PHYS 321. Charges at rest and

in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics. Prerequisite: PHYS 321. Offered: WSp.

PHYS 323 Electromagnetism (4) NW

Continuation of PHYS 322. Charges at rest and in motion; dielectric and magnetic media; electromagnetic waves; relativity and electromagnetism; physical optics. Prerequisite: PHYS 322.

PHYS 324 Quantum Mechanics (4) NW First part of a two-quarter sequence. Introduction to nonrelativistic quantum mechanics: need for quantum theory, Schrodinger equation, operators, angular momentum, the hydrogen atom, identical particles, and the periodic table. Prerequisite: either MATH 324, MATH 334, MATH 335, or MATH 336; minimum grade of 2.0 in PHYS 225; minimum grade of 2.0 in PHYS 228. Offered: ASU.

PHYS 325 Quantum Mechanics (4) NW

Continuation of PHYS 324. Introduction to nonrelativistic quantum mechanics: perturbation theory, the variational principle, radiation; application of quantum mechanics to atomic physics, magnetic resonance, scattering, and various special topics. Prerequisite: PHYS 324. Offered: W.

PHYS 328 Statistical Physics (3) NW

Elements of statistical mechanics and their applications. Prerequisite: PHYS 224; PHYS 324. Offered: Sp.

PHYS 331 Optics Laboratory (3) NW

Measurements of interference and diffraction, optical properties of matter, image processing, interferometry, holography. Prerequisite: PHYS 227. Offered: Sp.

PHYS 334 Electric Circuits Laboratory (3) NW

Basic elements of DC, AC, and transient circuits; electronic devices; electrical measurements. Prerequisite: either MATH 126, MATH 129, or MATH 136; 2.0 in PHYS 123. Offered: WS.

PHYS 335 Electric Circuits Laboratory (3) NW

Electrical measurements, data management, digital electronics of microprocessor systems. Building a microprocessor. Prerequisite: PHYS 334. Offered: SpS.

PHYS 401 Special Problems (*, max. 30)

Supervised individual study. Offered: AWSpS.

PHYS 402 Special Problems (*, max. 30)

Supervised individual study. Offered: AWSpS.

PHYS 403 Special Problems (*, max. 30)

Supervised individual study. Offered: AWSpS.

PHYS 405 Physical Science by Inquiry II (5-) NW

Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: A.

PHYS 406 Physical Science by Inquiry II (-5) NW

Emphasis on depth of understanding and development of reasoning and representational skills essential to the scientific process. Provides background for teaching physical science as a process of inquiry and develops scientific literacy. Offered: W.

PHYS 407 Physics by Inquiry II (5) NW

Selected topics in physics, with emphasis on depth of understanding and development of skills

essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 123. Offered: A.

PHYS 408 Physics by Inquiry II (5) NW

Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 407. Offered: W.

PHYS 409 Physics by Inquiry II (5) NW

Selected topics in physics, with emphasis on depth of understanding and development of skills essential to the scientific process. Background for teaching physics at secondary school and introductory college levels. Some mathematical proficiency required. Prerequisite: PHYS 408. Offered: Sp.

PHYS 410 Physics by Inquiry for In-Service Teachers (1-2, max. 30) NW

A "hands-on" inquiry-oriented approach designed to train in-service teachers in the use of the physical science content for any of several science programs selected by a school or school district. Credit/no credit only.

PHYS 411 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW

Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Credit/no credit only. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: A.

PHYS 412 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW

Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Credit/no credit only. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: A.

PHYS 413 Physics by Inquiry for Lead Teachers (1-4, max. 4) NW

Extends the content covered in previous courses and helps prepare lead teachers to train colleagues to use any of several science programs selected by schools or districts. Credit/no credit only. Prerequisite: two courses selected from PHYS 405, PHYS 406, PHYS 407, PHYS 408, and PHYS 409. Offered: A.

PHYS 421 Atomic and Molecular Physics (3) NW

Survey of the principal phenomena of atomic and molecular physics. Prerequisite: PHYS 323; PHYS 325. Offered: W.

PHYS 422 Nuclear and Elementary-Particle Physics (3) NW

Survey of the principal phenomena of nuclear and elementary-particle physics. Prerequisite: PHYS 323; PHYS 325. Offered: Sp.

PHYS 423 Solid-State Physics (3) NW

Survey of the principal phenomena of solid-state physics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

PHYS 424 Mathematical Physics (3) NW

Advanced classical mechanics. Prerequisite: PHYS 323; PHYS 325. Offered: A.

PHYS 427 Applications of Physics (1-3, max. 12) NW

Current applications of physics to problems in the sciences and technology.

PHYS 428 Selected Topics in Physics (1-5, max. 12) NW

PHYS 431 Modern Physics Laboratory (3) NW Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: A.

PHYS 432 Modern Physics Laboratory (3) NW

Measurement in modern atomic, molecular, and solid-state physics. Recommended: 30 credits in physics. Offered: W.

PHYS 433 Modern Physics Laboratory (3) NW

Techniques in nuclear and elementary-particle research. Offered: Sp.

PHYS 434 Application of Computers to Physical Measurement (3) NW

Laboratory giving specific instruction and experience in interfacing laboratory equipment to computers. Prerequisite: PHYS 334. Offered: A.

PHYS 436 Nonlinear Dynamics and Chaos (4) NW

Variational Principle, Lagrangian and Hamiltonian Mechanics, phase space, nonlinear dynamics, approach to chaos, Lyapunov exponents, applications to physical systems. Numerical exercises to illustrate phenomena. Prerequisite: MATH 309.

PHYS 441 Quantum Physics (4) NW

Introduction to concepts and methods of quantum physics: wave mechanics (de Broglie wavelength, uncertainty principle, Schrodinger equation), one-dimensional examples (tunneling, harmonic oscillator), formalism of quantum physics, angular momentum and the hydrogen atom. Recommended: 30 credits in physical science or engineering. Offered: W.

PHYS 451 Issues for Ethnic Minorities and Women in Science and Engineering (3/5) I&S

Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with WOMEN 485.

PHYS 460 Water in the Environment (3) NW

Baker, Raymond, Waddington, Warren Discusses the unique physical and chemical properties of the water molecule in relation to the atmospheric greenhouse effect, precipitation formation, oceanic circulations, infiltration of water through soils, geyser eruptions, and glacier and sea ice thickness. Prerequisite: either MATH 124, MATH 126, MATH 129, or MATH 136; PHYS 123. Offered: jointly with ATM S 460/ESS 424. Offered: A.

PHYS 485 Senior Honors Seminar (1, max. 3) NW

Offered: A.

PHYS 486 Senior Honors Seminar (1, max. 3) NW

Offered: W.

PHYS 487 Senior Honors Seminar (1, max. 3) NW

Offered: Sp.

PHYS 491 Independent Research (1-3, max. 3)

Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: A.

PHYS 492 Independent Research (1-3, max. 3) Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: W.

PHYS 493 Independent Research (1-3, max. 3) Supervised, independent study requiring written and oral presentations summarizing work accomplished. Recommended: 12 credits in physics above 200 level. Offered: Sp.

PHYS 494 Seminar on Current Problems in Physics (1, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: A.

PHYS 495 Seminar on Current Problems in Physics (1, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: W.

PHYS 496 Seminar on Current Problems in Physics (1, max. 3) NW Supervised, independent study of topics (chosen by faculty in charge) of current interest in physics. Written and oral presentation summarizing work accomplished are required. Recommended: 12 credits in physics above 200 level. Offered: Sp.

PHYS 501 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: A.

PHYS 502 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: W.

PHYS 503 Tutorials in Teaching Physics (1, max. 2) Preparation for teaching introductory physics; use and critical analysis of instructional materials in a collaborative learning environment; supervised teaching practicum in which instructional materials are used with undergraduates. Credit/no credit only. Offered: Sp.

PHYS 505 Mechanics (3) Lagrangian and Hamiltonian dynamics, with applications to various topics such as coupled oscillators, parametric resonance, anharmonic oscillations, chaos. Offered: A.

PHYS 506 Numerical Methods (3) Integration, solution of differential equations, Monte Carlo methods, function minimization, data analysis, modern computing techniques, computation in experimental physics. Offered: Sp.

PHYS 507 Physical Applications of Group Theory (3) Applications of finite and continuous groups, representation theory, symmetry, and conservation laws to physical systems. Offered: Sp.

PHYS 511 Topics in Contemporary Physics (3, max. 9) Topics of current experimental, theoretical, or technological interest in modern physics. Offered: Sp.

PHYS 513 Electromagnetism and Relativity (4) First of a three-part sequence. Principles of electrostatics, complex variable techniques, boundary value problems and their associated mathematical techniques, Green's functions. Offered: A.

PHYS 514 Electromagnetism and Relativity (3) Continuation of PHYS 513. Electric and magnetic fields in free space and material media, wave guides and cavity resonators. Offered: W.

PHYS 515 Electromagnetism and Relativity (4) Continuation of PHYS 514. Special relativity, electromagnetic radiation from accelerated charges, synchrotron radiation, Cerenkov radiation, radiation reaction. Offered: Sp.

PHYS 517 Quantum Mechanics (4) First of a three-part sequence. Modern non-relativistic quantum mechanics developed, beginning with its basic principles. Dirac and abstract operator notation introduced, starting with simple examples. Offered: A.

PHYS 518 Quantum Mechanics (4) Continuation of PHYS 517. Modern non-relativistic quantum mechanics. The character of the theory illustrated both with physical examples and with conceptual problems. Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: W.

PHYS 519 Quantum Mechanics (4) Continuation of PHYS 518. Modern non-relativistic quantum mechanics. Physical examples and conceptual problems. Topics include: atomic structure, scattering processes, density operator description of mixed states, and measurement theory. Abstract operator methods emphasized in the exposition of angular momentum, scattering, and perturbation theory. Offered: Sp.

PHYS 520 Advanced Quantum Mechanics — Introduction to Quantum Field Theory (4) Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: A.

PHYS 521 Advanced Quantum Mechanics — Introduction to Quantum Field Theory (3) Multi-particle systems, second quantization, diagrammatic perturbation theory, radiation, correlation functions and multi-particle scattering, relativistic theories, renormalizability, basic quantum electrodynamics, and other applications. Offered: W.

PHYS 522 Advanced Quantum Mechanics: Introduction to Modern Quantum Field Theory (3) Functional integrals, symmetry breaking, critical phenomena and continuum limits, and non-perturbative methods. Credit/no credit only. Offered: Sp.

PHYS 524 Thermodynamics and Statistical Mechanics (4) Statistical mechanical basis of the fundamental thermodynamical laws and concepts; classical and quantum statistical distribution functions; applications to selected thermodynamic processes and examples of Bose and Fermi statistics. Offered: W.

PHYS 525 Statistical Mechanics (3) Introduction to equilibrium and non-equilibrium aspects of

many-body systems; scale invariance and universality at phase transitions and critical phenomena; exactly soluble models; Markov processes, master equations and Langevin equation in non-equilibrium stochastic processes. Prerequisite: PHYS 524. Offered: A.

PHYS 527 Current Problems in Physics (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: A.

PHYS 528 Current Problems in Physics (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: W.

PHYS 530 Laser Physics (4) Physics underlying laser design and operation in the context of common laboratory systems. Topics may include continuous and pulsed lasers; solid, liquid, and gas gain media; Q-switching, mode-locking, resonator theory, nonlinear optics, and others. Prerequisite: basic quantum mechanics, electromagnetism, and optics; recommended: PHYS 541.

PHYS 532 Liquid Crystal Devices (4) Physics of liquid crystals and applications to practical display devices. Phases, phase transitions, optical and dielectric properties, molecular and device "engineering," future prospects.

PHYS 536 Introduction to Acoustics and Digital Signal Processing (4) *Chaloupka* Introduces mathematical and physics principles of acoustics in digital signal processing applications. Complex analysis and Fourier methods, physics of vibrations and waves, solutions of the wave equation, digital convolution and correlation methods, and Maximum Length Sequence method in signal analysis and spread-spectrum applications. Prerequisite: PHYS 123; MATH 120.

PHYS 541 Applications of Quantum Physics (4) Techniques of quantum mechanics applied to lasers, quantum electronics, solids, and surfaces. Emphasis on approximation methods and interaction of electromagnetic radiation with matter. Prerequisite: PHYS 421 or PHYS 441 or equivalent. Offered: Sp.

PHYS 542 Numerical Methods in Physics (4) Numerical methods for analysis and computation in physics. Topics may include integration, differential equations, partial differential equations, optimization, data handling, and Monte Carlo techniques. Emphasis is applications in physics. Prerequisite: 30 credits in physical sciences, computer science, or engineering.

PHYS 543 Electromagnetic Theory (4) Principal concepts of electromagnetism. Static electric and magnetic fields. Boundary-value problems. Electric and magnetic properties of materials. Electromagnetic waves and radiation. Prerequisite: 30 credits in physical sciences, computer science, or engineering. Offered: A.

PHYS 544 Applications of Electromagnetic Theory (4) Emphasis may vary from year to year. Topics may include electromagnetic waves, radiation, scattering, wave guides, plasma physics, quantum electronics, and accelerator physics. Prerequisite: PHYS 543 or equivalent.

PHYS 545 Contemporary Optics (4) Coordinated lecture and laboratory treatment of topics in contemporary optics. Subjects include Fourier

optics, lens systems, interferometry, laser optics, holography, polarization, crystal optics, birefringence, laser and conventional light sources, optical detectors. Prerequisite: PHYS 543 or equivalent.

PHYS 546 Condensed-Matter Physics (4)

Introduction to the theory of solids: crystal structure in real space and reciprocal space, phonons, free electrons, band theory, semiconductor devices. Prerequisite: PHYS 441 or equivalent.

PHYS 547 Electronics for Physics Research (4)

Electronic techniques as applied in physics research. Topics include noise, control-system analysis, operational amplifiers, lock-in amplifiers, precision power supplies and metering, data transmission, microprocessors. Several integrated measurement systems are examined in the context of specific research problems. Prerequisite: elementary electronics.

PHYS 549 Low-Temperature Physics and Cryogenics (4)

Condensed-matter physics at low and ultralow temperatures. Production of low temperatures; liquefaction of gases, dilution refrigeration, magnetic and compressional cooling. Macroscopic quantum effects: superconductivity, superfluidity. Applications of superconductors. The ultralow temperature frontier.

PHYS 550 Atomic Physics (3)

Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

PHYS 551 Atomic Physics (3)

Theory of atomic structure and spectra; atomic and molecular beams; resonance techniques; atomic collisions; topics of current interest. Prerequisite: PHYS 519.

PHYS 552 Introduction to Cosmic Ray Physics (3)

The nature and cosmological significance of cosmic ray photons and particles. The motion and confinement of particles in the geophysical, interplanetary, and interstellar medium. Theories of the processes involved in the high-energy interaction of cosmic rays, including shower theory. Methods of measurement and current problems. Credit/no credit only. Prerequisite: introductory quantum mechanics.

PHYS 554 Nuclear Astrophysics (3)

Big bang nucleosynthesis; nuclear reactions in stars; solar neutrinos and neutrino oscillations; core-collapse supernovae; nucleosynthesis in stars, novae, and supernovae; neutron stars; composition and sources of cosmic rays; gamma ray bursts; atmospheric neutrinos. Offered: jointly with ASTR 510; A.

PHYS 555 Cosmology and Particle Astrophysics (3)

Big bang cosmology; relativistic world models and classical tests; background radiation; cosmological implications of nucleosynthesis; baryogenesis; inflation; galaxy and large-scale structure formation; quasars; intergalactic medium; dark matter. Offered: jointly with ASTR 513; W.

PHYS 557 High Energy Physics (3)

First quarter of a three-quarter series. Emphasis on the experimental foundations of particle physics. Prerequisite: PHYS 519; recommended: PHYS 520, which may be taken concurrently. Offered: A.

PHYS 558 High Energy Physics (3) Second quarter of a three-quarter series. Phenomenology of the standard model of strong and electro-weak interactions, including an introduction to Feynman diagrams. Prerequisite: PHYS 519; recommended: PHYS 520 and PHYS 521, which may be taken concurrently. Offered: W.

PHYS 559 High Energy Physics (3)

Third quarter of a three-quarter series. Topics of current interest in high-energy particle physics. Prerequisite: PHYS 519; recommended: PHYS 520 and 521, which may be taken concurrently. Offered: Sp.

PHYS 560 Theoretical Nuclear Physics (3)

First of a two-part sequence. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: A.

PHYS 561 Theoretical Nuclear Physics (3)

Continuation of PHYS 560. Nuclear structure, scattering, reactions, and decays in terms of elementary properties of nucleons and current theoretical models. Prerequisite: PHYS 519. Offered: W.

PHYS 564 General Relativity (3)

First of a two-part sequence. General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: PHYS 515.

PHYS 565 General Relativity (3)

Continuation of PHYS 564. General covariance and tensor analysis, the relativistic theory of gravitation as given by Einstein's field equations, experimental tests and their significance, and applications of general relativity, particularly in the areas of astrophysics and cosmology. Prerequisite: PHYS 515.

PHYS 567 Theory of Solids (3)

First quarter of a course on modern solid state and condensed matter physics, aimed at bringing student's knowledge up to the level of current literature. Topics include structural, electronic, and vibrational properties; optical response functions and dynamics; transport theory; and cooperative phenomena. Prerequisite: PHYS 519, PHYS 524. Offered: AW.

PHYS 568 Theory of Solids (3)

Second quarter of a course on modern solid state and condensed matter physics, aimed at bringing the student's knowledge up to the level of current literature. Additional topics (see PHYS 567) include magnetism, quantum Hall effect, superconductivity. Offered: WSp.

PHYS 570 Quantum Field Theory (3)

Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

PHYS 571 Quantum Field Theory (3)

Emphasis varies in different years between relativistic quantum field theory and the many-body problem. Credit/no credit only. Prerequisite: PHYS 522.

PHYS 572 Modern Quantum Field Theory (3)

Advanced topics in quantum field theory. Credit/no credit only. Prerequisite: PHYS 570, PHYS 571.

PHYS 575 Selected Topics in Applications of Physics (*, max. 30) .

PHYS 576 Selected Topics in Experimental Physics (*, max. 30) .

PHYS 578 Selected Topics in Theoretical Physics (*, max. 30) Credit/no credit only.

PHYS 580 Physics Colloquium (*, max. 30) Credit/no credit only. Offered: AWSp.

PHYS 581 Seminar in High-Energy Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 582 Seminar in Particle Theory (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 583 Seminar in Relativistic Astrophysics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 584 Seminar in Recent Developments in Atomic Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 585 Seminar in Experimental Nuclear Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 586 Seminar in Condensed Matter Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 587 Seminar in Nuclear Theory (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 588 Particle Astrophysics Seminar (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 589 Seminar in Problems of Physics Education (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 590 Seminar in Statistical Physics (1-3, max. 20) Credit/no credit only. Offered: AWSp.

PHYS 600 Independent Study or Research (*)

Study or research under the supervision of individual faculty members. Credit/no credit only. Prerequisite: permission of supervisor. Offered: AWSpS.

PHYS 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson. Offered: AWSpS.

Political Science

Political Science

POL S 101 Introduction to Politics (5) I&S

Political problems that affect our lives and shape the world around us. Offered: AWSpS.

POL S 201 Introduction to Political Theory (5) I&S

Philosophical bases of politics and political activity. Provides an introduction to the study of politics by the reading of a few books in political philosophy. Organized around several key political concepts, such as liberty, equality, justice, authority, rights, and citizenship. Offered: AWSpS.

POL S 202 Introduction to American Politics (5) I&S

Institutions and politics in the American political system. Ways of thinking about how significant problems, crises, and conflicts of American society are resolved politically. Offered: AWSpS.

POL S 203 Introduction to International Relations (5) I&S The world community, its politics, and government. Offered: AWSpS.

POL S 204 Introduction to Comparative Politics (5) I&S Political systems in a comparative framework. Traditional and contemporary approaches to the study of governments and societies in different countries. Offered: WSp.

POL S 205 Political Science as a Social Science (5) I&S Methodological perspectives of the various social science disciplines: commonalities and differences in assumptions, values, and paradigms. Current issues from the multiple perspective of social sciences; limits of the social sciences in resolving key social issues. Offered: W.

POL S 212 Philosophy of Feminism (5) I&S Philosophical analysis of the concepts and assumptions central to feminism. Theoretical positions within the feminist movement; view of the ideal society, goals and strategies of the movement, intersections of the sex-gender system with other systems of oppression. Offered: jointly with PHIL 206/WOMEN 206.

POL S 213 The Korean Peninsula and World Politics (5) I&S Introduction to Korean politics, economics, society, and international relations since the late nineteenth century. Addresses the evolution of Korean in international society by comparing Korea's experience with that of China and Japan. Offered: jointly with SISEA 213.

POL S 246 African American Politics (5) I&S P. Rivers Survey of African Americans within the U.S. socio-political processes. Situates African Americans within a post-civil rights context where there is debate about race's centrality to an African American politics. Recommended: either AES 150, AFRAM 201, or POL S. 202. Offered: jointly with AFRAM 246.

POL S 249 Introduction to Labor Studies (5) I&S Conceptual and theoretical issues in the study of labor and work. Role of labor in national and international politics. Formation of labor movements. Historical and contemporary role of labor in the modern world. Offered: jointly with HIST 249/SOC 266.

POL S 270 Introduction to Political Economy (5) I&S Political economy as a tool for understanding and evaluating the political world. Combines theory, methods, and insights derived from economics and political science and applies them to a range of substantive issues.

POL S 273 The Concept of Political Power (5) I&S How to understand and explain relationships of power. Readings from Marxism, Weberian sociology, anarchism, classical political philosophy, and contemporary political science. May also include works of fiction.

POL S 281 Introduction to American Political Culture (5) I&S/VLPA Introduction to the methods and theories used in the analysis of American culture. Emphasizes an interdisciplinary approach to American literature, including history, politics, anthropology, and mass media. Offered: jointly with ENGL 251.

POL S 299 Special Topics in Political Science (2-5, max. 10) I&S Examines a different subject or problem of current interest with the discipline.

POL S 301 Special Topics in Political Theory (5, max. 10) I&S Selected contemporary political

issues. Political principles as reflected in concrete political problems. Topics might include: women's rights, civil disobedience, national health care, affirmative action, environmental protection, privacy, human rights, and redistribution of property. Recommended: POL S 101, POL S 201, POL S 202, POL S 203, POL S 204, or POL S 205.

POL S 303 Public Policy Formation in the United States (5) I&S Policy decision making with emphasis on: how issues arise, the way they become part of the policy agenda of the executive and the legislature, how these institutions organize to handle policy issues, and the roles of the legislature, the executive, and the bureaucracy. Public policy literature and familiarization with key aspects of policy decision making at the national, state, and local levels.

POL S 304 The Press and Politics in the United States (5) I&S Journalists' role in elections and public policy. Relationship between news coverage and political campaigns. Study and analysis of local political newswriting, reporting, and response by local and state political figures. Extensive off-campus experience included. Offered: jointly with COM 304.

POL S 305 The Politics of Mass Communication in America (5) I&S Role of mass audiences in politics from the standpoint of the communication strategies used to shape their political involvement. Topics include: social structure and political participation, political propaganda and persuasion, the political uses of public opinion, and the mass media and politics. Offered: jointly with COM 305.

POL S 306 Media, Society and Political Identity I&S (5) Explores how society and culture are both represented in and shaped by communication technologies and media content. Media include film, advertising, news, entertainment television, talk shows, and the Internet. Explores how media represent and affect individual identity, values, and political engagement. Offered: jointly with COM 306.

POL S 308 The Western Tradition of Political Thought, Ancient and Medieval (5) I&S Origin and evolution of major political concepts from ancient Greece to the medieval period, from Thales through Aquinas.

POL S 309 The Western Tradition of Political Thought, Pre-Modern (5) I&S Continuation of 308, treating materials from the fifteenth through eighteenth centuries, Machiavelli through Rousseau.

POL S 310 The Western Tradition of Political Thought, Modern (5) I&S Continuation of 308 and 309, focusing on material from the eighteenth through twentieth centuries, from Rousseau through Lenin.

POL S 311 Individual and the State (5) I&S Individualism and communitarian critics. Political and ethical implications of both. Nature of the state, liberty, responsibility, cooperation. Important individualist and collectivist literature, dealing with market institutions and citizen politics, critically assessed.

POL S 313 Women in Politics (5) I&S Theoretical, historical, and empirical studies of women's participation in political and social movements. Women's diverse efforts to improve their political, social, and economic status. Policy issues of particular concern to women. Women's

political experiences in household, local, regional, national, and international arenas Offered: jointly with WOMEN 313.

POL S 315 Black Identities and Political Power (5) I&S P. Rivers Related the deployment of political power within institutions to shifting racial identities. Shows how racial identities both reflect and inflect relations of domination and resistance within and between cultures in the black diaspora. Prerequisite: either AES 150, AFRAM 150, AFRAM 201, or POL S 201. Offered: jointly with AFRAM 315.

POL S 316 African-American Political and Social Thought (5) I&S Race relations in U.S. politics as defined by the struggle of African Americans for economic, political, and social equality. Studies of African-American political and social thought; expands and clarifies our understanding of the strengths and weaknesses of American democratic ideals.

POL S 317 The Politics of Race and Ethnicity in the United States (5) I&S Introduction to the history and development of racial hierarchy, focusing on how race and ethnicity shape political institutions (e.g., the Constitution, political parties, voting systems). Examination of political relationships between Whites, African Americans, Latinos, and Asian Americans. Case studies of minority representation and the politics of welfare, crime, immigration, and terrorism. Offered: jointly with LSJ 331.

POL S 318 American Political Thought I (5) I&S Major thinkers and themes in American political and cultural development from Puritan origins to the Civil War.

POL S 321 American Foreign Policy (5) I&S Constitutional framework; major factors in formulation and execution of policy; policies as modified by recent developments; the principal policymakers-President, Congress, political parties, pressure groups, and public opinion.

POL S 322 International Political Economy of Latin America (5) I&S Exploration of politics underlying Latin America's economic development. Topics covered include import-substituting industrialization, mercantilism, the debt crisis, neoliberalism, market integration, and poverty. Review of major theoretical perspectives such as modernization theory, dependency, and the new political economy. Offered: jointly with SISLA 322.

POL S 324 Europe in World Politics (5) I&S Independent and coordinated efforts of Britain, France, and West Germany to adapt to the post-World War II global system. Creation and development of the Atlantic Alliance. Relations with postcommunist states. Decolonization and the evolution of relations with the Third World. The movement for European integration. Recommended: POL S 203.

POL S 325 The Arab-Israeli Conflict (5) I&S The politics of conflicting ideologies: Zionism and Arab nationalism; formation of the state of Israel; development of Palestinian nationalism; Arab-Israeli wars. Re-emergence of Palestinian activism; domestic sources of foreign policy; the role of the superpowers.

POL S 326 Scandinavia in World Affairs (5) I&S Introduction to the foreign relations of Scandinavia with a focus on Nordic security, international economic pressures, and global conflict resolution. Survey of the national settings

for international involvements and highlights the dilemmas for industrial societies exposed to the pressure of interdependence. Offered: jointly with SCAND 326.

POL S 327 Women's Rights as Human Rights (5) I&S Women's rights in comparative perspective, focusing on varying settings that alter the meaning and practical application. Domestic level: areas including abortion politics to trafficking in women. International level: areas including equality claims before European supranational judicial bodies, rape as war crime in international law. Offered: jointly with LSJ 327.

POL S 328 International Organizations (5) I&S Explores historical, theoretical, and empirical aspects of the United Nations, its specialized agencies, and other international organizations, both governmental and nongovernmental. Recommended: POL S 203.

POL S 329 Global Communication (5) I&S Introduction to the history, purpose, channels, content, technologies, policy, and regulation of international communications systems. Issues covered include disparities in media development between post-industrial and developing nations, imbalances in international news and information flow, and the emergence of global communications. Offered: jointly with COM 322.

POL S 330 Communications in International Relations (5) I&S Looks at communications in relations between international groups and states. Examines the range of functions and roles communication media play in international affairs, global issues, and intergroup relations. Also examines the strategic use of communications by various groups. Offered: jointly with COM 321.

POL S 331 Government and Politics in the Middle East and North Africa (5) I&S Breakdown of traditional society and the problems of building modern political systems.

POL S 337 Collective Violence and the State (5) I&S Comparative study of collective violence in modern states with emphasis on riots and pogroms. Readings include case materials drawn from Russian pogroms of the nineteenth and twentieth centuries, Hindu-Muslim riots in modern India, and race riots in the United States and Great Britain. Offered: jointly with SIS 337.

POL S 340 Government and Politics of South Asia (5) I&S Comparison of problems of national integration and political development in India, Pakistan, and Ceylon. Offered: jointly with SISSA 340.

POL S 341 Government and Politics of Canada (5) I&S Critical analysis of parliamentary institutions, political parties, and the federal system in Canada. Offered: jointly with SISCA 341.

POL S 342 Government and Politics of Latin America (5) I&S Analysis of the political dynamics of change in Latin America comparing various national approaches to the political problems of modernization, economic development, and social change. Offered: jointly with SISLA 342.

POL S 343 Politics and Change in Southeast Asia (5) I&S Government and politics in the countries of Southeast Asia, with attention given to the nature of the social and economic environments that condition them. Offered: jointly with SISSE 343.

POL S 346 Governments of Western Europe (5) I&S Modern government and politics of Great Britain, France, Germany, and Italy.

POL S 350 Government and Interest Groups in the United States (5) I&S Agrarian, labor, professional, business, and ethnic interest in politics; impact on representative institutions and governmental processes.

POL S 351 The American Democracy (5) I&S Democratic theory; constitutional theory; the Presidency; Congress; the Supreme Court; civil rights and civil liberties. Designed for nonmajors.

POL S 352 American Political Parties (5) I&S Theories of American parties, campaigns and voting behavior; party leadership; political socialization and participation.

POL S 353 United States Congress (5) I&S Organization and procedure of Congress, state legislative politics, lobbying, legislative roles, theory and practice of representative government.

POL S 354 Elections and Voting in the United States (5) I&S Electoral institutions and processes of the United States: the idea and practice of elections, the electoral system, individual voting behavior, collective voting behavior, and the impact of elections on policy.

POL S 355 The American Presidency (5) I&S The American presidency; its evolution, its occupants, and its place within the American system. Topics include presidential character, war, elections, Watergate, the economy, and the Constitution.

POL S 356 Society and Politics (5) I&S Focus on the causes of political change in democratic countries, including public opinion, social movements, interest group activity, and party organization. Offered: jointly with SOC 356.

POL S 357 Minority Representation and the Voting Rights Act (5) I&S Explores whether and how African-Americans and Latinos are able to organize effectively and press their demands on the political system. Focuses on minority political behavior, the effect of these groups at the polls, the responsiveness of elected officials, and legal or constitutional obstacles affecting these phenomena.

POL S 360 Introduction to United States Constitutional Law (5) I&S Growth and development of the United States Constitution as reflected in decisions of the Supreme Court; political, social, and economic effects. Offered: jointly with LSJ 360.

POL S 361 United States Courts and Civil Liberty (5) I&S Cases and literature bearing on protection of constitutionally guaranteed private rights, with particular reference to the period since 1937. Offered: jointly with LSJ 361.

POL S 363 Law in Society (5) I&S Inquiry into how law matters in social practice. Examines general theories of law, the workings of legal institutions, and the character of legally constituted practices and relationships in diverse terrains of social life. Offered: jointly with LSJ 363.

POL S 365 Lawyers in American Politics (5) I&S Influence of lawyers on American politics. Official and unofficial political roles, lawyers as lobbyists, as legislators, in the bureaucracy,

politics of the American Bar Association. Includes study of legal education, professional values, and avenues of political access.

POL S 367 Comparative Law and Courts (5) I&S Introduction to comparative judicial politics, focusing on the relationship between law and politics in cross-national perspective, as well as on the functioning of supranational and international legal entities in the international system. Offered: jointly with LSJ 367.

POL S 368 The Politics and Law of International Human Rights (5) I&S Studies the international human rights movement in its legal and political context. Focus on institutions which influence, enable, and constrain the international promotion of human rights. Offered: jointly with LSJ 320.

POL S 382 State Government (5) I&S Focus on the structures, processes, and policy outputs of state governments in the United States.

POL S 383 Environmental Politics and Policy in the United States (5) I&S Interrelation between technological and environmental change and policy formation. Consideration of political behavior related to these phenomena and the capacity of urban public organizations to predict change and to formulate policies that can take future states into account.

POL S 384 Global Environmental Politics (5) I&S Examines the globalization of environmental problems, including climate change, ozone depletion, and loss of biodiversity, as well as the globalization of political responses to these problems within the framework of globalization as set of interlinked economic, technological, cultural and political processes. Offered: jointly with ENVIR 384.

POL S 398 Honors Seminar (5, max. 15) I&S Intensive and advanced studies in various aspects of political science. Open only to participants in the departmental honors program.

POL S 401 Advanced Special Topics in Political Theory (5, max. 10) I&S Topics can include, but are not limited to, analytical theory pertaining to justice, exploitation, and freedom; revolution and social changes; collective choice and action; sexuality and politics; critical theory; Marxist theory; post-structuralism. Content varies. Recommended: POL S 201.

POL S 403 Advanced Special Topics in International Relations (5, max. 10) I&S Examination of contemporary developments in the field of international relations. Content varies according to the nature of developments and research interests of the instructor.

POL S 404 Topics in Public Policy (3-5, max. 6) I&S Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with PB AF 499.

POL S 405 American Politics Seminar (5, max. 10) I&S Intensive reading and research in selected problems or fields of political analysis.

POL S 406 Marxian Political Economy (5) I&S Explores the relationship between social classes, the state, and political power in advanced capitalist societies. Investigates this relationship primarily by means of the tools of Marxian

political economy and, in the process, evaluates these tools. Emphasis on theoretical perspectives, although the reading list has a few empirical applications as well. Recommended: POL S 201.

POL S 407 International Conflict (5) I&S

Examines different theoretical explanations for the causes of war, including the role of international, state, organizational, and individual factors; additional topics vary with instructor. May include the development of warfare, deterring weapons of mass destruction, terrorism, intelligence, and the ethics of warfare.

POL S 409 Undergraduate Seminar in Political Economy (5, max. 10) I&S

Seminar in political economy with focus on Marxian and public choice approaches to political economy. Explores the questions raised by each approach, the assumption(s) and testability of hypotheses, and applies these approaches to a number of problems in political economy. Recommended: ECON 300; POL S 270. Offered: jointly with ECON 409.

POL S 410 Technology, Politics, and the State (5) I&S

Relationships between politics, technological change, and development of multinational corporations. Considers whether the relations between political and economic systems of industrial societies have been fundamentally altered by the increased importance and interdependence of government, experts, and new technological possibilities for intervention in social life.

POL S 411 Theories of the State (5) I&S

Topics may include origins and development of the state; arguments about the necessity, desirability, and proper role of the state; the nature and operation of modern states and the international state system; the legitimacy of modern state power.

POL S 413 Contemporary Political Theory (5) I&S

Analysis of political theorists, exploring contemporary theories of humanity and society that form the basis for differing political ideas.

POL S 414 Politics and Culture (5) I&S

How people interpret and shape the political world around them through the use of such cultural resources as language, symbolism, myth, and ritual. The various uses of these cultural elements establish the place of the individual in society, influence the perception of political events, and create opportunities for individual and mass political responses.

POL S 415 Women's Rights in an Integrated Europe (5) I&S

Examines the transformation in women's rights policy within the European community from the late 1950s through the present. Focuses on the legal rules and bodies that govern not only these policy domains, but also their evolution and impacts. Offered: jointly with LSJ 428.

POL S 416 Economic Theory as Applied to the Political System (5) I&S

Explanation and evaluation of the political system, using elementary economics theory. Topics include alternative voting rules, the political effectiveness of various types of groups, causes and consequences of logrolling, and bureaucratic organizations. Prerequisite: ECON 300. Offered: jointly with ECON 452.

POL S 419 United States-China Relations (5) I&S

Surveys the history of United States-China

relations and examines the evolution of bilateral relations, particularly since 1949. Focus on the period since 1972 and the major issues as they have evolved since that time, including trade, human rights, security, and Taiwan. Offered: jointly with SISEA 459.

POL S 420 Soviet and Russian Foreign Policy (5) I&S

Ideological, historical, and strategic components of Soviet foreign policy; Gorbachev's "new thinking" and the collapse of the USSR; redefining post-Soviet "Russia"; Russian military and security policy; Russia and the West; Russian relations with the Newly-Independent States.

POL S 421 Relations Among Communist and Post-Communist States (5) I&S

Major disputes and types of relationships among different communist states; international effects of the communist collapse; comparative dynamics of state-building, market reform, and democratic transition; international integration and domestic politics in the former Soviet bloc; ethnic conflict and the problem of state boundaries; redefining security in the post-communist milieu.

POL S 422 International Environmental Politics Seminar (5) I&S

Study of the practical and theoretical challenges associated with global ecological interdependence. Examination of international treaties and institutions, state, and nonstate actors with an emphasis on the emerging concept of sustainability.

POL S 423 International Law (5) I&S

Origin and present status of efforts to make rules of conduct for sovereign states; simulation of a treaty-drafting conference, with students playing roles of legal advisers to foreign governments.

POL S 425 War and Deterrence (5) I&S

Seminar addresses the strengths and weaknesses of deterrence theory and then applies it to a variety of international security issues. Topics may include deterring the use of nuclear, chemical, and biological weapons, the use of brute force when deterrence fails, and the role for humanitarian intervention.

POL S 426 World Politics (5) I&S

The nation-state system and its alternatives, world distributions of preferences and power, structure of international authority, historical world societies and their politics. Offered: jointly with SIS 426.

POL S 427 International Political Economy (5) I&S

Examines major theoretical problems, substantive issues, and school of thought in international political economy (IPE), including issues of trade, production, and finance. Preparation for critical analysis of dilemmas entailed in establishing and maintaining an instrumentally effective and ethically acceptable IPE system.

POL S 428 Military Intervention (5) I&S

Historical and theoretical analysis of military intervention in the post-World War II era. Considers how and why interventions occur and evaluates intervention as a foreign-policy response.

POL S 429 Political Parties in Japan and East Asia (5) I&S

Focus on political parties in Japan. Combines theoretical readings on political parties with intensive study of Japanese political parties. Recommended: either SISEA 242, SISEA 423, SISEA 440, or SISEA 442. Offered: jointly with SISEA 436.

POL S 430 Civil-Military Relations in Democracies (5) I&S

E. Kier Explores issues of civil-military relations in the United States including debates about the garrison state hypothesis; military advice on the use of force; the civil-military "gap"; and issues of race, gender, and sexual orientation in the military.

POL S 431 International Relations in the Middle East (5) I&S

Study of domestic sources of foreign policy in the Middle East; politics of oil; the East-West rivalry in the arena; and conflict and collaboration among the local powers.

POL S 432 Political Islam and Islamic Fundamentalism (5) I&S

Study of resurgence, since mid-1970s of political Islam and what has come to be called Islamic fundamentalism, especially in the Middle East. Topics include the nature and variety of political Islam today, causes and implications of the current resurgence, and comparison with previous resurgences. Offered: jointly with SIS 406.

POL S 433 International Relations in Southeast Asia (5) I&S

Analysis of the problems affecting relations among the countries of Southeast Asia.

POL S 434 International Relations of South Asia (5) I&S

Interrelationships of domestic, interstate, and extraregional forces and their effects upon the resolution or expansion of interstate conflicts in South Asia. Offered: jointly with SISSA 434.

POL S 435 Japanese Government and Politics (5) I&S

Government and politics of Japan with emphasis on the period since 1945. Offered: jointly with SISEA 435.

POL S 436 Ethnic Politics and Nationalism in Multi-Ethnic Societies (5) I&S

Provides a broad theoretical base, both descriptive and analytical, for the comparative study of ethnicity and nationalism. Examples drawn from ethnic movements in different societies. Some previous exposure either to introductory courses in political science or to courses in ethnicity in other departments is desirable. Offered: jointly with SIS 436.

POL S 437 Politics in Scandinavia (5) I&S

Twentieth-century politics in Scandinavia. How Scandinavian countries have been governed. Costs and consequences of their governmental style and its uncertain future. Optimal size of polities, problems of mature welfare states, process of leadership and representation in multiparty systems, decline of political parties. Offered: jointly with SCAND 437.

POL S 438 Politics in France (5) I&S

Study of contemporary France. Structures of government in the Fifth Republic; nature of French voting behavior and evolution of the bipolarized political party system; behavior of political interest groups; training of France's administrative elite and functioning of the state bureaucracy; dynamics of policy-making.

POL S 439 Politics of Divided Korea (5) I&S

Governments, politics, and economy of South and North Korea, the inter-Korea relations, and the two Koreas' relationship with the major powers -- especially the United States -- with emphasis on the post-cold war period. Offered: jointly with SISEA 439.

POL S 440 European Fascism (5) I&S

Analysis of fascism as revolutionary movement and type

of political system in post-World War I Europe: Hitler's Third Reich, Mussolini's Italy, and Vichy France. Consideration of dynamics of resistance, policies that produced Holocaust, and questions raised at trials of fascist leaders in Nuremberg and elsewhere.

POL S 441 Government and Politics of Russia (5) I&S Ideological and historical bases of Soviet politics; Leninism; Stalinism; Gorbachev's perestroika and the collapse of the USSR; the role of Yeltsin; problems of Russian state-building, market reform, and democratic transition; political parties and civil society; the relationship between the center and the regions; the problem of Russian national identity.

POL S 442 Government and Politics of China (5) I&S Post-1949 government and politics, with emphasis on problems of political change in modern China. Offered: jointly with SISEA 449.

POL S 443 Comparative Political Societies (5) I&S Analyses of modern and premodern types of stable political society; special attention to contemporary representative democracy.

POL S 444 Revolutionary Regimes (5) I&S Analysis of the several types of political regimes concerned with effecting fundamental social change; emphasis on the twentieth century.

POL S 445 Politics and Society in Eastern Europe (5) I&S Political and social issues in lands east of the Elbe, treating some historical problems but focusing particularly on developments since 1945. Includes all communist states of Eastern Europe and their successors. Offered: jointly with SISRE 445.

POL S 446 Peasants in Politics (5) I&S Interdisciplinary study of peasants, with special attention to questions of rural transformation. Peasant involvement in an increasingly interdependent world. Rebellion and revolution, impact of the international market, agricultural development. Offered: jointly with SIS 444.

POL S 447 Comparative Politics Seminar (5, max. 10) I&S Selected comparative political problems, political institutions, processes, and issues in comparative perspective. Strongly recommended: POL S 204.

POL S 448 Politics of the European Union (5) I&S Examines the origins, structures, and political dynamics of the European Union. Attention given to theories of integration, to relations between the European Union and member states, and to the role of the European Union in world politics.

POL S 449 Politics of Developing Areas (5) I&S Comparative study of problems of national integration and political development in the new states of Asia and Africa.

POL S 450 State-Society Relations in Third World Countries (5) I&S Relationships among political, social, and economic changes in Asia, Africa, and Latin America. Problems of economic and political development, revolution and reform, state-society relations, imperialism and dependency. Offered: jointly with SIS 456.

POL S 451 Communication Technology and Politics (5) I&S Employs some core concepts of political communication and theories of democracy to examine the emerging role of information and communication technologies in candidate and issue campaigning; online voting;

protest and advocacy movements; law-making and electronic governance in the United States and internationally. Offered: jointly with COM 407.

POL S 452 Mass Media and Public Opinion (5) I&S Examines the foundations of the idea of public opinion in a democratic environment and the role of mass communication in the organization, implementation, and control of that opinion. Considers these relationships from the perspectives of societal elites, media, and citizens. Offered: jointly with COM 414.

POL S 453 The State Legislature (5) I&S Study of American state legislatures, with special reference to Washington State Legislature. Student must spend several Fridays in Olympia when the legislature is in session. Those desiring a more extensive involvement with the legislature should enroll in the political internship.

POL S 454 Political Communication Seminar (5, max. 10) I&S Contemporary topics studying how communication affects citizen engagement with public life. Offered: jointly with COM 411.

POL S 455 Political Deliberation (5) I&S Exploration of philosophical and empirical writings on political deliberation in small groups, campaigns, and other public settings. Contemporary deliberative theory. Participation in face-to-face discussions on current issues. Recommended: either COM 273 or COM 373. Offered jointly with COM 417.

POL S 457 Topics in Labor Research (5, max. 10) I&S Analysis of the post-World War II decline of national labor movements and strategies employed to reverse this trend. Requires a major research project on organizing, bargaining, or another question in labor studies. Prerequisite: either POL S 249, HIST 249, or SOC 266. Offered: jointly with HIST 457.

POL S 460 Political Economy of the European Union (5) I&S Historical foundation of the European Economic Community; major phases of its development; theoretical explanations for European integration.

POL S 461 Mass Media Law (5) I&S Survey of laws and regulations that affect the print and broadcast media. Includes material on First Amendment, libel, invasion of privacy, freedom of information, copyright, obscenity, advertising and broadcast regulation, and matters relating to press coverage of the judicial system. Offered: jointly with COM 440.

POL S 462 The Supreme Court in American Politics (5) I&S Introductory public law course that examines the interplay of constitutional law and American politics with particular attention to the role of the Supreme Court in the formulation and implementation of public policy in such matters as criminal-law enforcement, civil rights political expression, and economic regulation.

POL S 463 Political Analysis of United States Social Programs (5) I&S Social problems in the United States and policy responses. National policies concerning poverty, health, welfare, manpower, and the Social Security system. Examination of subgovernments that cluster around each policy area.

POL S 464 The Politics of American Criminal Justice (5) I&S Political forces and value choices associated with the enforcement of criminal law. Distribution of resources among

participants in the criminal justice system (e.g., police, attorneys, defendants, and judges). Understanding and evaluation of the interaction of criminal justice processes with the political system.

POL S 465 Law and Public Policy in the United States (5) I&S Relationship between law and public policy, with particular attention to problems of social, economic, and political change. Considers legal and constitutional processes as they relate to such problems of public policy as race relations, the environment, and the economy.

POL S 466 Feminist Legal Studies: Theory and Practice (5) I&S Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with LSJ 466/WOMEN 410.

POL S 467 Comparative Law in Society (5) I&S Legal systems around the world as they actually work in their respective political, social, and economic contexts. Emergence and development of European legal systems, legal customs at variance with those of Europe, problems of legal processes in the modern state.

POL S 468 Comparative Media Systems (5) I&S Provides students an understanding of policies that shape national communication processes and systems. Uses comparative analysis to identify both similarities and differences among media structures of nations at different levels of development. Primary emphasis on broadcast media. Offered: jointly with COM 420/SIS 419.

POL S 469 Law, Development, and Transition in East Asia (5) I&S Examines the role of law and the courts in economic and political change in the developing world. Topics include variations in legal traditions and institutions, economic development, property rights, dispute resolution, democratization, and human rights. Empirical materials focus on East Asia. Offered: jointly with LSJ 469/SISEA 469.

POL S 470 Public Bureaucracies in the American Political Order (5) I&S Growth, power, and roles of governmental bureaucracies in America: conflict and conformity with American political thought, other political institutions, and the public.

POL S 473 Decision-Making in Politics (5) I&S Process of decision-making in politics at elite and mass levels, comparison of approaches based on the comprehensive rationality of decision makers with approaches based on limitations on the cognitive capacities of decision makers. Applications to real decision-making situations.

POL S 475 Public Choice (5) I&S Problems and prospects for collective action in a political democracy. Designing rules and institutions for effective central authority and effective constraints on governmental power. Social choice theory and game theory. Recommended: POL S 270 or POL S 474.

POL S 476 Strategy in Politics (5) I&S Explores the problem of finding fair methods for making social decisions, and examines alternative methods of social choice. Emphasis on the importance of agenda control for outcomes, and

the implications of theories of social choice for common interpretations of concepts such as democracy and the general will. Recommended: POL S 101 or POL S 202; POL S 481.

POL S 481 Big City Politics (5) I&S Contemporary big city politics, focusing on Seattle and the largest twenty-five cities. Social, economic, and political trends that have shaped characteristics of large American cities. Distribution and use of economic and political power among parties and groups. Future of large cities and politics of change.

POL S 488 Honors Senior Thesis (5-) I&S Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

POL S 489 Honors Senior Thesis (-5) I&S Students individually arrange for independent study of selected topics under the direction of a faculty member. Research paper is student's senior thesis. Students meet periodically as a group to discuss research in progress. Recommended: 15 credits POL S 398.

POL S 490 Foundations of Political Analysis (5) I&S Fundamental issues pertaining to research in political science: "logics of inquiry," problems of concept formation, and development of research methods. Positivist, postempiricist, and other arguments about the nature of scientific knowledge.

POL S 495 Study Abroad-Political Science (3-5, max. 15) I&S For participants in the study abroad program. Specific course content determined by assigned faculty member and announced in study abroad bulletin. Politics, political culture, and institutions related to their national setting.

POL S 496 Undergraduate Internship (5, max. 15) Students serving in approved internships.

POL S 497 Political Internship in State Government (5, max. 20) Students serving in approved internship program with state government agencies.

POL S 498 The Washington Center Internship (15) Full-time academic internship with the Washington Center in Washington, DC Includes internship activities, academic seminar, assemblies, and related activities. Credit/no credit only. Recommended: POL S 202; 45 UW credits.

POL S 499 Individual Conference and Research (2-5, max. 20) Intensive study with faculty supervision. No more than one registration in 499 under same instructor.

POL S 500 Political Research Design and Analysis (5) I&S Major quantitative methods of empirical research in political science. Primary emphasis on research design, data collection, data analysis, and use of computers.

POL S 501 Advanced Political Research Design and Analysis (5) I&S Third methods course in political research. Testing theories with empirical evidence. Examines current topics in research methods and statistical analysis in political science. Content varies according to recent developments in the field and with interests of instructor. Offered: jointly with CS&SS 501.

POL S 502 Qualitative Research Methods (5) I&S Introduction to qualitative methods in political science, emphasizing practical experience with techniques. Readings and exercises cover research design, multiple methods, varieties of qualitative data, measurement and validation, participant observation, interviewing, and content analysis. Research decision-making issues include analytical strategies, presentation of data, ethics, epistemology, and theory-building.

POL S 503 Advanced Quantitative Political Methodology (5) Quinn, Ward Theory and practice of likelihood inference. Includes probability modeling, maximum likelihood estimation, models for binary responses, count models, sample selection, and basis time series analysis. . Offered: jointly with CS&SS 503.

POL S 505 Comparative Politics (5) Core course. Modern theories, approaches, and methods in the study of comparative politics.

POL S 509 Political Theory—Core (5, max. 10) Introduction to central themes in political theory and the works of major political theorists, past and present.

POL S 511 Seminar in Ethical and Political Theory (5) Ethical writings of major political philosophers. Coherent themes arising from these works and assessment of their impact on concepts of politics.

POL S 513 Issues in Feminist Theory (5, max. 10) Contemporary issues in feminist theory as they affect studies of women, politics, and society. Content varies according to recent developments in the field and the research interests of the instructor.

POL S 514 Selected Topics in Political Theory (5, max. 15) Selected topics, historical and conceptual, national, regional, and universal. Prerequisite: permission of instructor.

POL S 515 Political Theory Research Seminar (5) Survey of paradigmatic research approaches in political theory through the exploration of a theme (canonical text, theoretical concept, and specific topic). Methods covered may include rational choice, psychoanalytic, Straussian, Marxian, and feminist approaches. Students carry out substantive theoretical research. Recommended: second- or third-year graduate standing.

POL S 516 Special Topics in American Political Thought (3/5) Special topics or themes in the development of American political culture.

POL S 517 Marxism and Critical Theory (5) Works of Marx and Engels as well as selected works of twentieth-century Marxist and critical theorists. Themes such as Marx's method, twentieth-century interpretations of Marx, and relationship of twentieth-century theorists to their eighteenth- and nineteenth-century forebears.

POL S 519 Modern Scandinavian Politics (5) Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with SCAND 519.

POL S 520 Seminar on Russian Foreign Policy (3) Selected topics in the development and objectives of the foreign policy of the

Russian Federation. Prerequisite: permission of instructor.

POL S 521 International Relations I: Theory and Method (5) Part one of the core course in the field of international relations. Reviews contemporary theory, research, and methodology in the study of world politics.

POL S 522 International Political Economy (5) Theories of international political economy. Focuses on the emergence and development of the modern world system, the transition from feudalism to capitalism, and the institution of the nation-state system. Examines the political economy of trade, investment, and the international division of labor from a variety of theoretical perspectives. Prerequisite: POL S 521.

POL S 523 World System Analysis (4) Evolution of the world system. Historical-structural approaches to world politics: neo-realism; long cycles; world economy. Prerequisite: POL S 521.

POL S 524 International Security (5) Kier, Mercer Introduces some of the major debates concerning the use of force in international politics. Covers traditional issues in international security such as alliances and the causes of war, as well as some of the new and important questions, such as explaining war outcomes and war termination.

POL S 525 International Law — Policy (5) Inputs of international law into the decisional process in foreign policy. Effect of policy on law. Relevant roles of individuals and institutions in routine and crisis situations. Prerequisite: POL S 423 or permission of instructor.

POL S 527 Special Topics in International Relations Research (5, max. 15) Examination of current topics in the theory and practice of world politics. Content varies according to recent developments in the field and research interests of the instructor.

POL S 528 Advanced International Relations Theory (5) Covers advanced works in international relations theory. e.g., realism, neorealism, game theory, and theories of cooperation and conflict. Includes some classic works (Thucydides, Hobbes, E. H. Carr) to show continuity of debates in the present. Modern theories of war, conflict, cooperation, and international institutions also explored. Prerequisite: POL S 521.

POL S 529 Problems of American Foreign Policy (3) Critical analysis of the historical foundations and contemporary problems of foreign-policy making, with attention given to selected foreign-policy decisions. Prerequisite: POL S 321 or permission of instructor.

POL S 530 Transatlantic Relations: The United States and Europe in World Politics (5) Fulfills required component of "American Module" of Transatlantic Studies program. Addresses political dynamics of relations between United States and Europe from American republic's founding to post-Cold War era. Limited to students in Transatlantic Studies program.

POL S 532 The Chinese Political System (5) Examination of key approaches, interpretations, and secondary literature in the study of contemporary Chinese politics. Prerequisite: permission of instructor. Offered: jointly with SISEA 532.

POL S 533 Seminar on Contemporary Chinese Politics (5) Research on selected problems in contemporary Chinese politics. Prerequisite: POL S 532 or permission of instructor. Offered: jointly with SISEA 533.

POL S 534 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore US foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with PB AF 530/SIS 534.

POL S 535 International Relations of Modern China (5) Foreign policy of the People's Republic of China: historical antecedents; domestic and international systemic determinants; and Chinese policies toward major states, regions, and issues. Prerequisite: a course on contemporary Chinese politics or history, or permission of instructor. Offered: jointly with SISEA 535.

POL S 536 Ethnic Politics and Nationality Formation (3) Seminar on analysis and theoretical understanding of two interrelated processes: ethnic group persistence and change over time; and the transformation of ethnic groups into politically self-conscious and influential nationalities. The readings and discussions deal with these two processes in the contexts of both developing societies and advanced industrial societies.

POL S 537 Approaches to East European Politics (3-5) Selected concepts and methodologies useful for the analysis of politics and social structure in the socialist countries of east-central and southeastern Europe. Prerequisite: permission of instructor. Offered: jointly with SISRE 504; alternate years.

POL S 538 Government and Politics in the Middle East and North Africa (5) Political change in the area within the context of comparative politics; breakdown of traditional political systems; new range of choice expressed in competing ideologies; governmental and nongovernmental instrumentation of change; and problems of international relations and regional conflict and integration.

POL S 539 International Relations of Northeast Asia (5) Comprehensive survey of contemporary international relations of Northeast Asia with emphasis on Russia, Japan, China, and the United States. Multidisciplinary approach placing contemporary problems in historical context, drawing on modern social science theories. Connections between defense and economics are examined. Prerequisite: permission of instructor. Offered: jointly with SISEA 551.

POL S 540 Problems in South Asian Politics (3) Research problems in contemporary Indian politics.

POL S 541 Institutions and Institutional Change in the Soviet Union, Russia, and the Newly Independent States (5) Critical appraisal of the principal theories and research methods dealing with the development of the Soviet state from 1917-1991 and the formation of the newly-independent states after the Soviet collapse. Prerequisite: permission of instructor.

POL S 542 Seminar: State and Society (5) Examines the mutually conditioning relationship between states and the societies they seek to

govern. Studies states as large, complex organizations and their interactions with society on different levels. Shows that interactions on any level affect the nature of the state on other levels as well. Offered: jointly with SIS 542.

POL S 543 Latin American Politics (5) Theories of authoritarianism, corporatism, democratization, and revolution in Latin America. Explores role of international and domestic economic factors shaping politics and the affect of politics on economic development. Examines elite behavior and grassroots social movements.

POL S 544 Problems in Comparative Government (5, max. 15) Selected problems in the comparative analysis of political institutions, organizations, and systems.

POL S 547 Politics of Reform (5) Examines cases of reform in democratic political systems, e.g., Roosevelt's New Deal, Allende's Chilean "revolution," Mitterand's socialist experiment in France, and the Thatcher government in Britain.

POL S 548 Comparative Political Parties (5) Role of political parties in the modern state. Similarities and differences in origins and development of political parties and functions they perform, both in established democracies and in developing countries.

POL S 549 Problems of Political Development (5) Concepts of development and modernization, with particular attention to their political dimensions and their application to various historical and contemporary cases.

POL S 550 American Politics — Core (5) Core course in American government and politics. Systematic survey of the literature; focuses on national politics. Prerequisite: undergraduate courses in American government and politics.

POL S 551 Political Communication (5) Surveys classic works and new directions in political communication, including functionalist, structuralist, constructivist, network, and comparative approaches, reflecting a range of methods. Examines political organizing, electoral and legislative processes, civic (dis)engagement, media and politics, public deliberation and opinion formation, political identity and discourse. Offered: jointly with COM 551.

POL S 552 Special Topics in Political Communication (5, max. 10) Examination of current topics in the theory and practice of political communication.

POL S 553 Public Opinion (5) Selected problems in opinion formation, characteristics, and role of public opinion in policy-making process. Prerequisite: POL S 452.

POL S 554 Legislative Politics (5) Selected problems in legislative processes and leadership, state and national.

POL S 555 American Politics Topics (5, max. 10) Examination of current topics in the theory and practice of American politics. Content varies according to recent developments in the field and research interests of the instructor.

POL S 556 American Political Development (5) *Price* Examination of leading works in, and theories of, American political development. Topics include the development approach itself; critical junctures in U.S. political history; key changes in institutions, the American state, the

representation of interests and party politics; and the relevance of development studies to current politics.

POL S 557 United States Party System (5) Examines the institutional and behavioral foundations of party politics in the United States, emphasizing key historical patterns of party system development and the major scholarly approaches to the study of the American parties and party politics.

POL S 558 Political Deliberation (5) VLPA I&S *Gastil* Exploration of deliberative theories of democracy and research on political discussion in campaigns, face-to-face meetings, on-line forums, and informal conversations. Presents different uses and understandings of deliberation and its role in democratic governance. Recommended: COM 577, POL S 551/COM 551. Offered: jointly with COM 555.

POL S 559 Special Topics in Political Methodology (5, max. 10) Examination of current topics on the theory and practice of political methodology. Course content varies according to recent developments in the field and the research interests of the instructor.

POL S 560 Hierarchical Modeling for the Social Sciences (4) Explores ways in which data are hierarchically organized, such as voters nested within electoral districts that are in turn nested within states. Provides a basic theoretical understanding and practical knowledge of models for clustered data and a set of tools to help make accurate inferences. Prerequisite: SOC 424-425-426 or equivalent; recommended: CS&SS 505-506 or equivalent. Offered: jointly with CS&SS 560/STAT 560.

POL S 561 Law and Politics (5) Points and levels at which law and politics intersect. What is distinctive about legal forms; how these legal forms influence, and are influenced by, politics. Conceptions of law, courts and public policy, law and bureaucracy, civil and criminal justice, and the legal profession.

POL S 562 Law, Politics, and Social Control (5) Explores works of social scientists and lawyers regarding these competing conceptions of social control: as the seamy side of law — reinforcing equitable patterns of domination and disciplining deviants; as law embodying society's basic values, articulating minimum rules for harmonious social interaction.

POL S 563 Supreme Court in American Politics (5) Explores the tendency in the United States to turn to the Supreme Court to provide constitutional solutions for some of our biggest social, economic, and political problems. Focuses on the controversies concerning the legitimacy and capacity of the Supreme Court to intervene in American politics and public policy.

POL S 564 Law and the Politics of Social Change (5) Explores the many ways that law figures into the politics of social struggle and reform activity. Analyzes law in terms of particular state institutions (courts, agencies), professional elites (lawyers, judges), and especially cultural norms ("rights" discourses) that are routinely mobilized by reform-movement activists.

POL S 565 Special Topics in Public Law (5, max. 10) Examination of current topics on the theory and practice of public law. Content varies according to recent developments in the field and the research interests of the instructor.

POL S 567 Discourse and the Politics of Resistance (5) Examines how disciplines theorize and empirically study discourse in the politics of resistance. Examines the discursive turn in U.S. and European "new" social movement theory. Ranges across disciplines, such as political sociology, cultural anthropology and human geography, to discover ways in which discourse is conceptualized and studied for its role in seeding social change. Offered: jointly with COM 554.

POL S 566 Comparative Law and Politics (5) Study of the interaction between law and politics, at both the macro and micro levels of politics, and discussion of research drawing from a wide array of geographical settings. Examination in comparative context of whether macro-structures are autonomous from underlying social structures of power and interest in the micro-level.

POL S 570 The American Racial State(5) Explores the mutually constitutive relationship between race and American political institutions, beginning with theories of race and racial constructions, race-making and nation-making, racial triangulation, and intersectionality. Examines various institutions and public policies as manifestations of the American racial state, focusing on the epistemological challenges of identifying race, racism, and racialization.

POL S 571 American National Institutions (5) Answers the question, "Do institutions matter?" Surveys American national institutions from theoretical perspectives, focusing on how they affect the manner in which decisions are made. Employs cross-institutional perspective of American institutions.

POL S 572 Administrative and Executive Leadership (3) Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities.

POL S 573 Topics in Public Policy (5, max. 10) Specialized research topics with a policy process or related theoretical content.

POL S 574 Environmental Regulation Policy (5) Scholarly and practical aspects of environmental regulation. Examines literature concerning regulatory policy design, policy instruments, federalism, compliance and enforcement. Studies selected federal, state, and other nations' environmental policies. Participants are expected to have a good understanding of American policy processes.

POL S 575 Public Policy Processes (5) Covers political science research about policy processes. Research seminar addressing frameworks and perspectives concerning policy processes as they concern issue emergence, agenda dynamics, policy subsystems, policy learning, and implementation.

POL S 576 Political Culture (5) Values, beliefs, and rituals that guide political action in society. Some approaches emphasize symbolic sphere of value and belief over material conditions of power and economic production. Other approaches emphasize material relations. Reconciliation of symbolic and materialist approaches that explain intervention of the modern state in cultural processes.

POL S 577 The Politics of Social Movements (5) Theoretical inquiry directed to questions of

collective action and political tactics by social movement groups. Case studies include labor, civil rights, women's, environmental, and other movements in twentieth-century United States.

POL S 578 Health Politics and Policy (5) Introduces central themes of health- policy research: health is not health care and politics has much to do with why our health-care system works as it does. Investigates how social science helps us understand health issues.

POL S 582 Institutional Analysis (5) Social change and property rights theory. Exploration of long-term secular change through works whose approaches derive from neoclassical economics and analytical Marxism. Evolution and transformation of property rights over land, labor, and capital and the consequences of the property rights structure for political and economic institutions.

POL S 583 Economic Theories of Politics (5) Problems of public goods provision and collective action. Collective action theories and applications as well as critical review of the concept of rationality.

POL S 584 Comparative Political Economy (5) Overview of current developments in comparative political economy. Topics may include globalization, the welfare state, partisan models of economic policymaking, economic development, and trade.

POL S 587 Politics of Urban Reform (5) Interpretations of urban reformers at turn of this century and during 1960s and 1970s. Historical and political science literature on the subject. Prerequisite: graduate student standing and permission of instructor.

POL S 588 Special Topics in Comparative Political Economy (5, max. 10) Examination of current topics in the theory and practice of comparative political economy. Content varies according to recent developments in the field and research interests of the instructor.

POL S 589 Special Topics in Political Economy (3-5, max. 10) Evaluating research in political economy as well as developing research problems. Topics vary with instructor and with current problems in the literature. Prerequisite: POL S 406, POL S 416, ECON 400, and permission of instructor.

POL S 590 Seminar in Political Behavior (5, max. 10) Analysis of behavioral research in selected fields of political science.

POL S 593 Theories of Decision Making (5) Explanation of political decisions using models of such theoretical processes as preference formation, learning, heuristics, noncooperative games, collective action, agenda manipulation, and coalition formation. Examination of competing notions of political rationality and irrationality and criteria for their evaluation. Strategies for design of decision research. Prerequisite: POL S 491 or permission of instructor.

POL S 594 Political Communication Research Practicum: Community, Communication, and Civic Engagement (5) Overview of the research process, including literature review, hypothesis generation, data gathering, empirical analysis, and writing for publication Topics vary with instructor, but generally address questions of how communication affects democracy and

citizen engagement in national or international contests. Offered: jointly with COM 556.

POL S 595 College Teaching of Political Science (1) .

POL S 597 Directed Readings (1-10, max. 10) Intensive reading in the literatures of political science, directed by the chair of the doctoral supervisory committee. Credit/no credit only.

POL S 598 Independent Writing I (1-5, max. 5) Supervised research and writing for graduate students completing the MA essay of distinction.

POL S 599 Independent Writing II (3-5) Supervised research and writing for graduate students completing the Ph.C. essay of distinction.

POL S 600 Independent Study or Research (*).

POL S 800 Doctoral Dissertation (*).

Law, Societies, and Justice

LSJ 299 Special Topics in Law, Societies, and Justice (2-5, max. 10) I&S Examines a different subject or problem of current interest within the discipline.

LSJ 301 Internship (1-5, max. 5) Participation in an approved internship. Credit/no credit only.

LSJ 310 Research in Law, Societies, and Justice (1-5, max. 15) I&S Supervised introductory individual and/or seminar based research on some aspect of society and justice.

LSJ 320 The Politics and Law of International Human Rights (5) I&S Studies the international human rights movement in its legal and political context. Focuses on institutions which influence, enable, and constrain the international promotion of human rights. Offered: jointly with POL S 368.

LSJ 321 Human Rights Law in Culture and Practice (5) I&S Introduces the complexities of issues surrounding human rights. Examines human rights concerns through critical analyses, taking into account legal, social, economic, and historical variables. Offered: jointly with ANTH 323.

LSJ 327 Women's Rights as Human Rights (5) I&S Women's rights in comparative perspective, focusing on varying settings that alter the meaning and practical application. Domestic level: areas including abortion politics to trafficking in women. International level: areas including equality claims before European supranational judicial bodies, rape as war crime in international law. Offered: jointly with POL S 327.

LSJ 330 Beyond Civil Rights: Law, Culture, and Change (5) I&S Assessment of the contemporary politics of civil rights as shaped by an identity politics that is both significant and passe. Recommended: LSJ 363 or one course in either AES or WOMEN. Offered: jointly with AES 330.

LSJ 331 The Politics of Race and Ethnicity in the United States (5) I&S Introduction to the history and development of racial hierarchy, focusing on how race and ethnicity shape political institutions (e.g., the Constitution, political parties, voting systems). Examination of political relationships between Whites, African Americans, Latinos, and Asian Americans. Case

studies of minority representation and the politics of welfare, crime, immigration, and terrorism. Offered: jointly with POL S 317.

LSJ 332 Disability and Society: Introduction to Disability Studies (5) I&S Introduction to the field of disability studies. Focuses on theoretical questions of how society predominantly understands disability and the social justice consequences. Examines biological, social, cultural, political, and economic determinants in social creation/construction (framing) of disability and effects on those claiming and/or labeled as disabled. Offered: jointly with CHID 332.

LSJ 355 Introduction to the American Court System (5) I&S Philosophical and structural bases of the American court system; roles of attorneys, judges and the public in that system. Some focus also on current challenges to the courts posed by court congestion and alternative dispute resolution, and on future prospects for the courts.

LSJ 360 Introduction to United States Constitutional Law (5) I&S Growth and development of the United States Constitution as reflected in decisions of the Supreme Court; political, social, and economic effects. Offered: jointly with POL S 360.

LSJ 361 United States Courts and Civil Liberty (5) I&S Cases and literature bearing on protection of constitutionally guaranteed private rights, with particular reference to the period since 1937. Offered: jointly with POL S 361.

LSJ 362 Law and Justice: An Introduction to Social Theory (5) I&S *Godoy* Provides conceptual tools for understanding law and its role in society by acquainting students with major currents of social theory. Topics include liberalism, Marxism, critical feminist theory, and critical race theory. Offered: jointly with SIS 362.

LSJ 363 Law in Society (5) I&S Inquiry into how law matters in social practice. Examines general theories of law, the workings of legal institutions, and the character of legally constituted practices and relationships in diverse terrains of social life. Offered: jointly with POL S 363.

LSJ 367 Comparative Law and Courts (5) I&S Introduction to comparative judicial politics, focusing on the relationship between law and politics in cross-national perspective, as well as on the functioning of supranational and international legal entities in the international system. Offered: jointly with POL S 367.

LSJ 375 Crime, Politics, and Justice (5) I&S Reviews the major components — police, courts, and corrections — of the U.S. criminal justice system; investigates critical factors that shape criminal procedure; considers the relationship between criminal procedure and wider concerns of justice.

LSJ 376 Drugs and Society (5) I&S *Beckett* Explores the questions of drug use and abuse, social and political factors that shape response to their use, and the social conditions under which drug use is likely to have adverse consequences. Also covers U.S. drug control policy, the political economy of legal and illegal drugs, and political aspects of drug use. Offered: jointly with SOC 376.

LSJ 377 Punishment: Theory and Practice (5) I&S *Love* Examines the philosophical reasoning that underlies punishment practices such as

sentencing, imprisonment, or capital punishment. Considers policy issues in these areas in light of theories about morality and human nature. Helps students learn how to analyze punishment policies from ethical and philosophical perspectives.

LSJ 378 Policing the City (5) I&S *Herbert* Investigates how and why formal and informal order is established in urban areas, how this order produces advantages and disadvantages, and possibilities of alternative visions of order. Topics include formal means of control (zoning, laws, policing, building codes) and informal means of control (gossip, ostracism, peer pressure, local politics). Offered: jointly with GEOG 378; A.

LSJ 379 Prisons in Anthropological Perspective (5) I&S *Rhodes* An introduction to prisons from an anthropological point of view, with focus on prisons as total institutions. Topics include the experiences of prisoners and staff, prison history, issues of race and gender associated with incarceration, and the imprisonment of the mentally ill. Offered: jointly with ANTH 379.

LSJ 380 Contemporary Issues in Law, Societies, and Justice (5, max. 10) I&S Theoretical, empirical, and comparative aspects of such topics as human rights, socio-legal concepts, justice, and legal policy. Recommended: POL S 101, POL S 202, POL S 204, or SOC 110.

LSJ 400 Senior Seminar (5, max. 10) For students in their final year as Law, Societies, and Justice majors. Incorporates material learned in student's primary field of specialization. Includes independent research, oral presentations, and the completion of a substantial paper.

LSJ 401 Field Experience in Law, Societies, and Justice (5) Participant observation in a public or private agency relevant to the study of law, justice, human rights, or court systems.

LSJ 410 Human Rights in Latin America (5) I&S Human rights in Latin America, focusing on twentieth century dictatorships and current regional events and their implications for human rights. Cannot be taken for credit if GIS 174 or SISLA 120 previously taken. Offered: jointly with SIS 470. Prerequisite: either ANTH 323, LSJ 320, LSJ 321, POL S 368, PHIL 338, SIS 200, or SIS 201.

LSJ 420 The Politics of Rights (5) M. McCann Examines rights in practical and social interaction, rights as social conventions, relations of rights practices to official state policies, disputing practices, interest formation, and identify construction at individual and group levels. Explores how rights practices figure into the constellation of contested power relations within modern societies.

LSJ 421 Women's Rights and Politics in Islamic Society (5) I&S Human rights theory with women's legal rights and practice within context of the Islamic state. Introduction to debates regarding universality of human rights through examination of women's rights in Muslim context. Considers journalistic notions of homogeneity among Muslims, political nature of the Islamic state, and its mobilization of human rights. Offered: jointly with ANTH 498.

LSJ 425 Domesticating International Human Rights: Perspectives on U.S. Asylum and Refugee Law (5) I&S Examines the creation,

production, and proliferation of law and legal categories relating to the status of refugees and asylum-seekers in the United States. Integrates anthropological perspectives of law's ability to create meaning in the examination of deeper implications of asylum and refugee law in American society. Offered: jointly with ANTH 497.

LSJ 428 Women's Rights in an Integrated Europe (5) I&S Examines the transformation in women's rights policy within the European community from the late 1950s through the present. Focuses on the legal rules and bodies that govern not only these policy domains, but also their evolution and impacts. Offered: jointly with POL S 415.

LSJ 433 Disability Law, Policy, and the Community (5) Seminar addressing legal rights of disabled people, history of disability policy in the United States, and the role of community activism and other forces in policy development and systems change. Introduction to the existing social service systems that affect disabled people. Recommended: LSJ 332. Offered: jointly with CHID 433.

LSJ 434 Civil and Human Rights Law for Disabled People (5) I&S Designed for students interested in expanding their knowledge of civil and human rights for disabled people. Examines the American perspective (ADA) as well as various international models including the United Nations' International Human Rights treaties as they relate to disabled people. Recommended: LSJ 332. Offered: jointly with CHID 434; A.

LSJ 440 Criminal Law and Procedure (5) I&S Substantive and procedural criminal law for lay persons; analysis of the philosophy behind the law, with an emphasis on due process in adult and juvenile courts; case-analysis teaching technique.

LSJ 444 Ethics in Law and Justice (5) I&S Applies ethical theories, research, and practice to the law and justice system, with the goals of: (1) analyzing the moral dimensions of criminal law, (2) studying ethical issues in law enforcement, adjudications, and corrections, and (3) examining a variety of controversial ethical issues associated with the justice system.

LSJ 466 Feminist Legal Studies: Theory and Practice (5) I&S Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with POL S 466/WOMEN 410.

LSJ 469 Law, Development, and Transition in East Asia (5) I&S Examines the role of law and the courts in economic and political change in the developing world. Topics include variations in legal traditions and institutions, economic development, property rights, dispute resolution, democratization, and human rights. Empirical materials focus on East Asia. Offered: jointly with POL S 469/SISEA 469.

LSJ 470 Evaluation Research in Criminal Justice (5) I&S Social science research methods relevant to criminal justice evaluation and operations research. Ethical considerations, formulation of goals and objectives, problem definition and research design, sources and methods of data collection, descriptive statistics, data interpretation, and utilizations of research results.

LSJ 473 Corrections (5) I&S Analyzes research on diversionary methods, treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution, probation, parole, halfway houses, other alternatives to incarceration; correctional institutions. Organization of state, federal systems. Problems of administration. Subsidies, governmental control. Planning, public participation. Recommended: SOC 371 and SOC 372. Offered: jointly with SOC 473.

LSJ 474 Geography and the Law (5) I&S *Herbert* Examines the relationship between geography, law, and socio-legal analysis; reviews significant instances where law and geography intersect, such as the regulation of public space, the regulation of borders and mobility, and disputes over property and land use. Offered: jointly with GEOG 474.

LSJ 476 Miscarriages of Justice (5) I&S Examines legal and social factors that shape criminal case outcomes, analyzing how one type of miscarriage of justice — wrongful conviction — occur. How can cases of wrongful conviction be explained? Why are some people, against whom there is only weak evidence, convicted—and sometimes even executed? Offered: jointly with SOC 476.

LSJ 480 The Police (5) I&S Conceptual and empirical issues concerning multifaceted and changing roles of the American police.

LSJ 485 Introduction to Organized and White Collar Crime (3) I&S Overview of organized and white collar crime. Exposure to definitional problems, distinctive characteristics, potential areas of overlap, and barriers to more effective social control. Addresses impediments resulting from inadequate conceptualizations, legal and operational difficulties in pursuing offenders, and effects of corruption and discretion in the justice system.

LSJ 488 Honors Thesis (5-) I&S First of a two-course hyphenated sequence. To be completed with LSJ 489.

LSJ 489 Honors Thesis (-[1-5, max. 5]) I&S Thesis research honors option. Second of a two-course hyphenated sequence. To be completed with LSJ 488. Offered: A.

LSJ 490 Special Topics in Law, Societies, and Justice (1-5, max. 15) I&S Examination of socio-legal topics. Content varies.

LSJ 495 Study Abroad-Law, Societies, and Justice (3-5, max. 15) I&S Comparative studies abroad of legal institutions, rights, and justice as related to national settings. Specific course content determined by faculty member.

LSJ 499 Readings in Law, Societies, and Justice (1-5, max. 10) Individual readings in law, societies, and justice.

LSJ 501 Law and Society Studies (5) *Beckett, Herbert, McCann* Provides a broad overview of, and introduction to, the interdisciplinary field of Law and Society Studies, including the historical development of law and society studies and an overview of its main concerns and questions.

Psychology

PSYCH 101 Introduction to Psychology (5) I&S *McDermott, Osterhout, Passer* Surveys

major areas of psychological science. Core topics include human social behavior, personality, psychological disorders and treatment, learning, memory, human development, biological influences, and research methods. Related topics may include sensation, perception, states of consciousness, thinking, intelligence, language, motivation, emotion, stress and health, cross-cultural psychology, and applied psychology. Offered: AWSpS.

PSYCH 200 Comparative Animal Behavior (5) NW *Barash, Beecher, Brenowitz, O'Donnell* Research methods and findings of comparative animal behavior, their importance to an understanding of human behavior; rationale for study of behavioral differences/similarities between animal species, behavior viewed as part of adaptation of each species to its natural habitat. Not open for credit to students who have taken PSYCH 300.

PSYCH 201 Human Performance Enhancement (4) I&S *Smith, Small* Applications of psychological theories, research, and intervention strategies to performance enhancement in variety of life settings. Self-regulation models and techniques; stress and emotional control; attention control and concentration; mental rehearsal; time management; goal-setting; memory enhancement; communication and interpersonal conflict resolution. Participation in various psychological training procedures. Prerequisite: PSYCH 101.

PSYCH 202 Biopsychology (5) NW *Bernstein, Diaz, Mizumori, Olavarria* Examines the biological basis of behavior, the nervous system, how it works to control behavior and sense the world, and what happens when it malfunctions. Topics include learning and memory, development, sex, drugs, sleep, the senses, emotions, and mental disorders. Prerequisite: PSYCH 101. Offered: AWSpS.

PSYCH 203 Introduction to Personality and Individual Differences (4) I&S *Cauce, Lengua, Linehan, Marlatt, Smith* Overview of the major theories, research findings, and applications in the scientific study of personality. Covers research methods and approaches to measuring personality variables. Not open for credit to students who have taken PSYCH 303. Prerequisite: PSYCH 101.

PSYCH 206 Human Development (5) I&S Theoretical perspectives and research methods in child development with an overview of historical and current works. Includes prenatal and biological development, the development of cognitive, linguistic, and social and emotional abilities. Not open for credit to students who have taken PSYCH 306. Prerequisite: PSYCH 101.

PSYCH 207 Psychology of Peace (5) I&S *Barash* Examination of the psychological aspects of peace in the modern world. Topics include theories of individual aggressiveness and violence, leadership personalities, crisis decision making, nuclear psychology, images of the enemy, and psychological opportunities and obstacles to the establishment of a peaceful society.

PSYCH 209 Fundamentals of Psychological Research (5) *Buck, Kerr, Little, Passer* Psychological research methodology and techniques. Topics include the logic of hypothesis testing, experimental design, research strategies and techniques, fundamentals of scientific writing, search and evaluation of research

literature in psychology, and ethical issues in psychological research. Required for all psychology majors. Prerequisite: 2.0 in PSYCH 101. Offered: AWSpS.

PSYCH 210 Human Sexuality (5) I&S *McDermott* Broad survey of biological, psychological, and social determinants of human sexuality and sexual behavior. Topics include cultural diversity, sexual development (physical and psychological), sexual health, reproduction (pregnancy, contraception, abortion), development of sex, gender and orientation, adult sexual bonding, sexual abuse and assault.

PSYCH 245 Introduction to Social Psychology (5) I&S *Brown, Shoda* Overview of major findings of social psychology, emphasizing the relevance for understanding the social behaviors of individuals and groups of individuals and their relationship to social context. Not open for credit to students who have taken PSYCH 345. Prerequisite: PSYCH 101.

PSYCH 250 Racism and Minority Groups (5) I&S *Barrett* Overview of the causes, contexts, and consequences of racism and its effects upon minority groups and society. Emphasis on cultural history, political and socioeconomic structures that contribute to racism. Examination of current issues in race relations and cultural pluralism in U. S. and selected international topics.

PSYCH 257 Psychology of Gender (5) I&S *Kenney* Major psychological theories of gender-role development; biological and environmental influences that determine and maintain gender differences in behavior; roles in children and adults; topics include aggression, cognitive abilities, achievement motivation, affiliation. Recommended: either PSYCH 101 or WOMEN 200. Offered: jointly with WOMEN 257.

PSYCH 260 Psychosocial Aspects of Nuclear War (3) I&S *Barash* Introduction to basic issues of nuclear war, including its effects, weaponry, and history of the arms race. Primary focus on the psychologic underpinnings of deterrence, relations between nations, and the personal and social forces operative in the arms race and peace movements.

PSYCH 300 Animal Behavior (5) NW *Barash, Beecher, Ha, O'Donnell, Sisneros* Introduces important concepts and empirical findings in animal behavior. Emphasizes evolutionary and mechanistic approaches to understanding diversity and complexity of behavior. Topics include communication, mating, migration, and sociality. Prerequisite: either BIOL 101, BIOL 118, BIOL 161, BIOL 180, or BIOL 203.

PSYCH 303 Personality (5) I&S *Lengua, Smith* Overview of major perspectives, scientific issues, applications, and research findings in the area of personality. Direct exposure to scientific literature, writing assignments, and research-based class experiences prepare students for advanced work in personality, social, abnormal, and developmental psychology. Prerequisite: PSYCH 101; either PSYCH 202 or PSYCH 222; PSYCH 209; either PSYCH 213, PSYCH 217, PSYCH 315, or PSYCH 317.

PSYCH 305 Abnormal Psychology (5) I&S *Beauchaine, George, Kohlenberg, Linehan, Simoni, Smith, Zoellner* An overview of major categories of psychopathology, including description and classification, theoretical models, and recent research on etiology and treatment.

Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 306 Developmental Psychology (5) I&S *Barrett, Carlson, Meltzoff, Repacholi, Sommerville* Overview of past and present theoretical and research-based approaches to biological, cognitive, and social development from the prenatal period to early adolescence. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 315 Understanding Statistics in Psychology (5) QSR *Ha, Little* Statistics for psychological research. Elementary probability theory, hypothesis testing, and estimation. Satisfies the statistics requirement for majors registered in the Psychology Bachelor of Arts degree program. Prerequisite: 2.0 in PSYCH 209; 2.0 in either MATH 111, MATH 112, MATH 120, MATH 124, or MATH 144. Offered: AWSpS.

PSYCH 317 Introduction to Probability and Statistics for Psychology (5) QSR *Little, G. Loftus* Probability theory as a model for scientific inference. Probabilistic variables and experimental outcomes, conditional probability, binomial and related distributions, experiments as samples, statistics and sampling distributions, the normal distribution, confidence intervals, problems of estimation from experiments. Prerequisite: 2.5 in PSYCH 209; 2.0 in either MATH 124, MATH 127, MATH 134, MATH 144, or MATH 112. Offered: AW.

PSYCH 318 Statistical Inference in Psychological Research (5) QSR *Little, G. Loftus* Hypothesis testing: probabilistic and statistical basis. Development and application of statistical inference techniques employed in psychological research: confidence intervals, t-test, ANOVA, and correlation and regression. Nature and control of experimental and inferential error in research. Required for majors for psychology BS degree. Prerequisite: either 2.0 in PSYCH 217 or 2.0 PSYCH 317. Offered: WSp.

PSYCH 322 Introduction to Drugs and Behavior (3) NW *Diaz* Basic concepts of drug action emphasizing the behavioral consequences of the intake of a variety of drugs. Prerequisite: either PSYCH 202 or PSYCH 222.

PSYCH 330 Laboratory in Animal Behavior (5) NW *Brenowitz, Ha* Experience with a variety of animal species and experimental procedures and instrumentation. Prerequisite: either 2.0 in PSYCH 213, 2.0 in PSYCH 217, 2.0 PSYCH 315, or 2.0 in PSYCH 317; 2.0 in PSYCH 209.

PSYCH 331 Laboratory in Human Performance (5) I&S *Joslyn* Selected aspects of human cognition, perception, and performance. Prerequisite: 2.0 in PSYCH 209; either 2.0 in PSYCH 213, 2.0 in PSYCH 217, 2.0 in PSYCH 315, or 2.0 in PSYCH 317.

PSYCH 332 Laboratory in Animal Learning (5) NW *Buck* Selected aspects of animal learning emphasizing behavioral experiments with the rat. Prerequisite: either 2.0 in PSYCH 213, 2.0 in PSYCH 217, 2.0 in PSYCH 315, or 2.0 in PSYCH 317.

PSYCH 333 Sensory and Perceptual Processes (5) NW *Beecher, Buck, Covey* An overview of each of the major senses with emphasis on the structure and function of sensory systems and the relation of the underlying biology to perceptual processes and behavior. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 335 Human Factors Psychology (4) I&S *Kerr* Consideration of human performance factors in the design of tools/equipment, tasks/jobs, and work and living environments. Emphasis on the importance of human perception, memory, attention, and motor control for understanding ways to optimize the relationship between people and technology. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 345 Social Psychology (5) I&S *J.D. Brown, Shoda* The scientific study of how people's thought, feeling, and action influence, and are influenced by, other people. Prerequisite: 2.0 in either PSYCH 202 or PSYCH 209.

PSYCH 347 Psychology of Language I (5) I&S/VLPA *Corina, Osterhout* Introduction to the study of language, including language structure, speech perception, language acquisition, psychological processes underlying comprehension and production of language, the relation between brain and language, and the question of the species-specificity of human language. Prerequisite: either 2.0 in PSYCH 209, 2.0 in LING 200, or LING 201. Offered: jointly with LING 347.

PSYCH 350 Honors Research Seminar in Psychology (2-, max. 4) *Bassok* Presentations by professors and advanced students concerning the rationale, methodology, and progress of their research projects; assistance with research projects; preparation of junior paper. Four credits of 350 required for all junior honors and distinction candidates in conjunction with 498 and 499. Offered: AWSp.

PSYCH 355 Cognitive Psychology (5) I&S Current theory and research in perception, attention, memory and learning, attitudes, thinking and decision making, and language. For the student who wishes a survey or who intends additional work in any of the above content areas. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 357 Psychobiology of Women (5) NW *Kenney* Physiological and psychological aspects of women's lives; determinants of biological sex; physiological and psychological events of puberty; menopause; sexuality; contraception, pregnancy, childbirth, and lactation; role of culture in determining psychological response to physiological events. Recommended: PSYCH/WOMEN 257. Offered: jointly with WOMEN 357.

PSYCH 361 Laboratory in Social Psychology (5) I&S *Greenwald* Methodology of laboratory and field research on social behavior; data analysis and report writing; group research projects. Prerequisite: 2.0 in PSYCH 209; 2.0 in either PSYCH 213, PSYCH 217, PSYCH 315, or PSYCH 317; 2.0 in either PSYCH 245 or PSYCH 345.

PSYCH 380 Cross-Cultural Competence (4) I&S Facilitates development of multicultural competence; focuses on mental health/social service needs of ethnic and linguistic minorities, and developing personal/interpersonal skills to reduce barriers, enhance effective service provision to cross cultural groups, sexual minorities and disabled people. Prerequisite: PSYCH 250; either PSYCH 305 or PSYCH 306.

PSYCH 399 Foreign Study (3-5, max. 10) Upper division psychology courses for which there are no direct University of Washington

equivalents taken through the University of Washington Foreign Study Program.

PSYCH 400 Learning (5) I&S/NW Experimental research and basic theories primarily in animal learning. Prerequisite: 2.0 in PSYCH 202.

PSYCH 402 Infant Behavior and Development (3/5) I&S *Meltzoff* Psychological development in the first two years of life. Basic and advanced techniques for assessing psychological development in infancy. Classic theories of human infancy and examination of a wide range of new experiments about infant behavior and development. Prerequisite: 2.0 in either PSYCH 206, PSYCH 306 or PSYCH 414.

PSYCH 403 Motivation (5) I&S/NW Theory and research on reinforcement, punishment, frustration, preference, instinctual mechanisms, and other factors controlling animal behavior. Prerequisite: 2.0 in PSYCH 202.

PSYCH 404 Psychobiology of Motivation (5) I&S/NW Physiological mechanisms underlying thirst, salt appetite, hunger, reproduction, drug addiction, and fear. Evolutionary and learning processes that influence motivation. Prerequisite: 2.0 in PSYCH 202.

PSYCH 406 Insect Behavior (4) NW *O'Donnell* Explores complexity and diversity of behavior in insects and related invertebrate animals. Overview of important lineages of insects and major behavioral traits. Examines how insect biology both constrains behavior and provides evolutionary opportunities. Prerequisite: either 2.0 in BIOL 180, 3.5 in PSYCH 200, or 2.0 in PSYCH 300. Offered: jointly with BIOL 406.

PSYCH 407 History of Psychology (5) I&S Historical and theoretical background of the basic assumptions of modern psychology, including such doctrines as behaviorism, determinism, and associationism and the scientists who developed them. Prerequisite: 2.0 in PSYCH 209.

PSYCH 408 Mechanisms of Animal Behavior (4) NW *Beecher, Brenowitz* Comparative exploration of physiological and perceptual mechanisms that control behaviors necessary for survival and reproduction in animals. Model systems discussed include animal communication, mate choice, escape behavior, learning and memory, orientation, biological rhythms, foraging behavior. Prerequisite: either 2.0 in BIOL 180, or 3.5 in PSYCH 200, or 2.0 in PSYCH 300. Offered: jointly with BIOL 408.

PSYCH 409 Sociobiology (5) NW *Rohwer* Biological bases of social behavior, emphasizing evolution as a paradigm. Emphasizes how to think like evolutionary biologist, especially with regard to interest conflict. Topics are individual versus group selection, kin selection, altruism, mating systems, sexual conflict, alternate reproductive strategies, and parent/offspring conflict. Prerequisite: either 3.5 in PSYCH 200, 2.0 in PSYCH 300, 2.0 in BIOL 162, or 2.0 in BIOL 180. Offered: jointly with BIOL 409.

PSYCH 410 Child and Adolescent Behavior Disorders (5) I&S *Barrett, Beauchaine, Katz, McMahon* Introduction to psychopathology in children and adolescents, and an overview of principal modes of intervention. Particularly for students interested in advanced work in clinical psychology, social work, or special education. Prerequisite: 2.0 in PSYCH 305; either 2.0 in PSYCH 306 or 2.0 in PSYCH 202, 2.0 in PSYCH 206 and 2.0 in PSYCH 209.

PSYCH 411 Perceptual Development (5) I&S/NW *Meltzoff* Origins and development of perception in human infancy. Object, face, and speech perception; cross-modal relations between touch, vision, audition. Prerequisite: 2.0 in either PSYCH 206, PSYCH 306, or PSYCH 414. Offered: jointly with SPHSC 411.

PSYCH 413 Adolescent Development (5) I&S Provides an overview of physical, cognitive, psychosocial, and emotional development of adolescents with an emphasis on understanding the context in which young people grow up. Explores cultural, environmental, and social influences on development. Prerequisite: 2.0 in PSYCH 209; 2.0 in either PSYCH 315 or PSYCH 317.

PSYCH 414 Cognitive Development (5) I&S *Sommerville* Key theoretical and research approaches to cognitive development from infancy through adolescence. Sensorimotor development, language development, imitation, number concepts, logical reasoning, memory, cognition in adolescents, intelligence, and the role of biology, environment, and experience. Prerequisite: either 2.0 in PSYCH 306, or 2.0 in both PSYCH 206 and PSYCH 209.

PSYCH 415 Personality Development of the Child (5) I&S *Carlson, Repacholi* Socialization theory and research, infant attachment and social relationships, development of aggressive and altruistic behaviors, sex-role development, moral development, parent and adult influences. Applied issues in social development and policy. Prerequisite: 2.0 in either PSYCH 206 or PSYCH 306; 2.0 in either PSYCH 315 or PSYCH 317.

PSYCH 416 Animal Communication (5) NW *Beecher, Brenowitz, O'Donnell, Sisneros* Evolution and mechanisms of animal communication and related processes of perception, thinking, and social behavior. Prerequisite: either 2.0 in BIOL 180, 3.5 in PSYCH 200, or 2.0 in PSYCH 300.

PSYCH 417 Human Behavior as a Natural Science (5) I&S/NW *Lockard* Evolution of human social behavior and the adaptive significance of communication systems from a sociobiological and anthropological perspective. Prerequisite: either PSYCH 200, PSYCH 300, BIO A 201, or BIOL 180.

PSYCH 418 Primate Social Behavior (5) NW *Lockard* Social behavior, ecology, and group structure of monkeys and apes from an evolutionary, sociobiological, and anthropological perspective. Prerequisite: either 3.5 in PSYCH 200, 2.0 in PSYCH 300, 2.0 in BIO A 201, 2.0 in BIOL 180, or 2.0 in both BIOL 202 and BIOL 203.

PSYCH 419 Behavioral Studies of Zoo Animals (5, max. 10) NW *Lockard* Observational studies of behavior of zoo animals to expand basic knowledge of animal behavior, conservation of endangered species, and research methodology with discussions and tours focusing on zoo philosophy and operations. Offered in cooperation with Woodland Park Zoo. Prerequisite: either 2.0 in BIOL 180, 3.5 in PSYCH 200, or 2.0 in PSYCH 300.

PSYCH 420 Drugs and Behavior (3) NW *Diaz* Animal and clinical research on the behavioral consequences of drug intake. Prerequisite: PSYCH 322.

PSYCH 421 Neural Basis of Behavior (5) NW *Diaz* Anatomical and physiological principles and

resultant behavior involved in the integrative action of the nervous system. 431 recommended but not required to follow 421. Prerequisite: 2.0 in PSYCH 202.

PSYCH 423 Sensory Basis of Behavior (5) NW *Olavarria* Study of sensory mechanisms as a way to understand behavior. Basic properties of neurons, anatomy, and physiology of sensory systems, with some emphasis on the visual system. Prerequisite: 2.0 in either PSYCH 202 or PSYCH 333.

PSYCH 424 Vision and Its Physiological Basis (5) NW *Teller* Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: 2.0 in either PSYCH 333, NBIO 302, or PHIL 160. Offered: jointly with PBIO 424.

PSYCH 425 Surgical and Histological Techniques (5) NW Practicum in basic and advanced surgical and histological techniques used in psychophysiological experimentation. Prerequisite: PSYCH 421.

PSYCH 426 Neurobiology of Learning and Memory (4) NW *Mizumori* Theory and research on how animals learn and remember, including basic concepts of brain plasticity, how brain areas and neurons adapt to changes in experiences throughout the lifespan, and cellular and structural substrates of a "memory." Prerequisite: 2.0 in either PSYCH 222, PSYCH 322, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423.

PSYCH 427 Behavioral Endocrinology (5) NW *Lattemann* The endocrine system and how its secretions influence and are influenced by behavior; relationships between the nervous and endocrine systems. Prerequisite: PSYCH 421.

PSYCH 428 Human Motor Control and Learning (5) I&S/NW *Kerr* Current theory and research in human motor performance and skill acquisition. Prerequisite: 2.0 in PSYCH 209; 2.0 in PSYCH 202.

PSYCH 429 Brain Anatomy for the Behavioral Scientist (1) NW *Diaz* Detailed review of the neuroanatomical features of the sheep brain with laboratory demonstrations. Prerequisite: PSYCH 421 which may be taken concurrently.

PSYCH 430 Development of Brain Connections (4) NW *Olavarria* Analysis of innate and environmental factors that play a role in the development of brain connections. Critical review of current literature on the various strategies used by neurons to find their appropriate targets. Prerequisite: 2.0 in either PSYCH 202, PSYCH 333, PSYCH 421, PSYCH 422, or PSYCH 423.

PSYCH 432 Visual Perception (4) I&S/NW *Rudd* Surveys current facts/theories about how our brains interpret the images formed by our eyes to create a presentation of the visual environment. Topics include 3-D vision; color, form, motion, and object perception; and visual illusions. Prerequisite: 2.0 in either PSYCH 202, PSYCH 333, or PSYCH 355.

PSYCH 433 Regulatory Behavior (4) NW *Kenney* Neural and endocrine mechanisms in the control of food and water intake and the regulation of body weight and fluid balance. Prerequisite: either PSYCH 421 or PSYCH 427.

PSYCH 435 Human Color Vision (5) I&S/NW *Buck* Discusses how color does not exist in the physical environment but is instead a creation of our brains. Explores perceptual, physiological, developmental, evolutionary, genetic, and cultural aspects of human color vision, including its role in language, culture, and art. Prerequisite: PSYCH 202; PSYCH 209.

PSYCH 436 Developmental Aspects of Sport Competition (4) I&S *Smoll* Biophysical and psychosocial influences of sport participation on growth and development of children and youth. Competition readiness, injuries, stress, aggression, roles and responsibilities of parents and coaches. Prerequisite: 2.0 in PSYCH 209.

PSYCH 437 Motor Development (4) NW *Smoll* Analysis of motor development from prenatal origins through adolescence with emphasis on relations between biophysical and psychosocial development of children and youth. Prerequisite: 2.0 in PSYCH 209.

PSYCH 438 Social Psychology of Sport (4) I&S *Smith, Smoll* Reciprocal effects of interpersonal and group influence processes, e.g., social facilitation, behavior modification, observational learning, individual versus group performance, group cohesion, leadership, aggression. Prerequisite: 2.0 in PSYCH 101; 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 441 Perceptual Processes (5) I&S/NW Theory and findings in perception with a focus on visual perception in humans. Discrimination and constancy for simple judgments, segregation and identification of visual objects, and specific areas of investigation such as reading and computer vision. Prerequisite: 2.0 in PSYCH 333.

PSYCH 443 Motivational Theories in Social Psychology (5) I&S *Plaks* Theories of motivation in social psychology. Emphasis on how motivation and cognition mutually influence each other to produce behavior. Explores such topics as persuasion, goal pursuit, self-regulation, achievement, and social comparison. Prerequisite: 2.0 in PSYCH 345.

PSYCH 445 Theories of Social Psychology (5) I&S *J.D. Brown* Evaluation of the major theories of human social behavior supported by the empirical literature; theories of social cognition and thought; major theories of social interaction, group processes, and social learning. Prerequisite: PSYCH 345.

PSYCH 446 Personality Assessment (3) I&S *R. Smith* Measurement of personality variables in personality research, social psychology, and clinical psychology. Theoretical conceptions underlying various clinical and experimental scales and an assessment of their construct validity and behavioral correlates. Prerequisite: 2.0 in PSYCH 303; 2.0 in PSYCH 315; 2.0 in PSYCH 317.

PSYCH 447 Psychology of Language II (4) I&S/VLPA *Corina, Osterhout* Psychological principles applied to linguistic development and organization; language in both its stimulus and response aspects. Prerequisite: 2.0 in either PSYCH 347, PSYCH 355, or LING 400. Offered: jointly with LING 447.

PSYCH 448 Seminar in Psychology (1-15, max. 15) Selected research topics of contemporary interest. Quarterly listings of specific offerings are available at departmental advisory office.

PSYCH 450 Honors Research Seminar in Psychology (2-, max. 4) *Bassok* Senior thesis research; preparation of senior thesis; oral presentation of research. Four credits of 450 required for all senior honors and distinction candidates in conjunction with 498 and 499. Offered: AWSp.

PSYCH 451 Health Psychology (5) I&S/NW Overview of the psychological and behavioral factors in health and disease. Includes research on both psychological causes and treatments. Topics include stress, risky behaviors, patient-provider interactions, pain, behavioral/medical treatments, and lifestyle interventions. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209; 2.0 in either PSYCH 303, or PSYCH 345.

PSYCH 452 Psychology of the Self-Concept (4) I&S *J.D. Brown* Examines psychological theory and research on the role of the self-concept in regulating behavior. Topics include the development of the self-concept; self-awareness; and self-esteem maintenance. Prerequisite: 2.0 in either PSYCH 245 or PSYCH 345.

PSYCH 454 Personality and Social Influence (4) I&S *Shoda* Survey of various theories and research for analyzing person-situation interactions — how the qualities of persons and situations combine to generate thoughts, feelings, and behaviors of a person in a given social situation. Prerequisite: PSYCH 209; either PSYCH 203, PSYCH 245, PSYCH 303, or PSYCH 345.

PSYCH 456 Social and Moral Development (5) I&S *Kahn* Theoretical approaches toward explaining children's social and moral development, including those that are nativistic, sociobiological, behavioristic, psychoanalytic, and constructivist. Use of theory to investigate applied problems related to parenting, education, peer relationships, authority, sexuality, culture, ecology, and technology. Prerequisite: either PSYCH 206 or PSYCH 306.

PSYCH 457 Language Development (5) I&S/ VLPA First-language acquisition and use by children. Emphasis on theoretical issues and research techniques. Prerequisite: 2.0 in either PSYCH 206, PSYCH 306, LING 200, or LING 400. Offered: jointly with LING 457.

PSYCH 462 Human Memory (5) I&S *Joslyn* Research and theory in key areas of memory. Issues covered include information processing theory, the link between memory processes and their biological underpinnings, autobiographical memory, implicit memory, and the effect of emotion on memory. Prerequisite: 2.0 in PSYCH 209; recommended: PSYCH 355.

PSYCH 465 Intelligence (5) I&S Analysis of individual differences in cognition. Includes description/use of psychometric ("intelligence test") models, test scores' relationship to academic and non-academic performance, information processing and biological models of intelligence (including genetic models). Discussion of male-female and demographic group differences in cognition. Prerequisite: either PSYCH 315 or PSYCH 317; PSYCH 355.

PSYCH 466 Psychology of Judgment and Decision Making (5) I&S *Miyamoto* Human information processing in judgment and decision making, especially the interface between cognitive theories and normative and prescriptive theories of decision making. Prerequisite: 2.0 in either PSYCH 315 or PSYCH 317; either PSYCH 331, PSYCH 355, or PSYCH 361.

PSYCH 469 Psychology of Reasoning (4) I&S *Bassok* Cognitive processes in human learning, problem solving, deductive and inductive reasoning. Prerequisite: 2.0 in PSYCH 209.

PSYCH 470 Psychology and Music (5) I&S/ VLPA *Covey* Introduction to the scientific study of musical behavior. An overview of current topics in the psychology of music from the areas of musical perception and cognition, musical development, music therapy, musical performance, and composition. Includes psychoacoustical and neuropsychological foundations, research methods, and some basic material in music theory. Prerequisite: 2.0 in either PSYCH 202 or NBIO 302.

PSYCH 471 Applied Issues in Cognition (4-5, max. 10) I&S *Joslyn* Examines cognitive issues in applied settings, such as the workplace and education. Topics include such issues as attention, expertise, problem solving, decision-making, human error, automation, navigation, and individual differences. Prerequisite: PSYCH 209.

PSYCH 480 Ideas of Human Nature (5) I&S *Barash* Reviews various approaches to the nature of human nature, including ideas from ancient philosophy, theories of the soul, empiricism, idealism, conditioning, social constructions, concepts of Freud, Marx, the existentialists, and neo-Darwinism. Prerequisite: PSYCH 101.

PSYCH 481 Seminar in Advanced Quantitative Methods (3) *Little* Examines the role of statistical methods in psychological research. Issues and controversies surrounding null hypothesis significance testing. Review of selected alternative statistical methods in psychology. Prerequisite: 2.0 in either PSYCH 315 or PSYCH 318.

PSYCH 482 Advanced Research Methods for Behavioral Psychology (4) QSR *Greenwald, Shoda* Develops skills of collecting and analyzing behavioral research data, communicating the results orally and in writing, and expressing perspectives on issues of scientific method and practice. Prerequisite: either PSYCH 315 or PSYCH 317; either PSYCH 330, PSYCH 331, PSYCH 332, or PSYCH 350. Offered: Sp.

PSYCH 488 Stress and Coping (4) I&S/NW Reviews theories and research concerning stress and its roles in behavior, personality, development, health, and interpersonal relationships. Coping analyzed as a factor in the way people respond to stressful circumstances. Prerequisite: 2.0 in PSYCH 202; 2.0 in PSYCH 209.

PSYCH 489 Clinical Psychology (3) I&S *George* Basic issues, methods, and research: professional issues, psychological assessment, and approaches to psychotherapy and behavioral change. Prerequisite: 2.0 in PSYCH 305.

PSYCH 490 Stress Management (3) I&S/NW Nature of stress. Physiological responses to stress and relaxation. Techniques of stress management with training in relaxation, biofeedback, meditation, cognitive restructuring, exercise, nutrition, interpersonal communication skills, and time management. Prerequisite: PSYCH 101.

PSYCH 494 Field Study in Animal Behavior (2-3, max. 9) *Kyes* Field experience in areas relating to animal behavior through participation

in seminar discussion and field exercises and training at foreign and domestic field study sites.

PSYCH 496 Undergraduate Teaching Experience in Psychology (2-3, max. 6) Students are trained as assistants in quiz sections or as supplemental tutors for undergraduate psychology courses. Designed especially for those students planning graduate work or education certification. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

PSYCH 497 Undergraduate Fieldwork (2-5, max. 10) Individual consultation with faculty member and supervised practicum experience in a broad range of community settings and agencies dealing with psychological problems. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

PSYCH 498 Directed Reading in Psychology (1-3, max. 18) Readings in special interest areas under supervision of departmental faculty. Discussion of reading in conference with the instructor. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

PSYCH 499 Undergraduate Research (1-3, max. 18) Design and completion of individual research projects. An overall maximum of 18 credits in 496, 497, 498, and 499 may apply toward a baccalaureate degree.

PSYCH 500 Proseminar in Psychology (1, max. 10) *Greenwald* Presentations on professionally and practically useful topics by guest faculty presenters designed for first-year and second-year graduate students. Credit/no credit only. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 502 Core Concepts in Animal Behavior (3) *Barash, Beecher, O'Donnell* Reading, reports, and discussion on animal behavior, with a focus on topics that lie at the interface of animal behavior, evolutionary science, neurobiology, and psychology. Include social organization, mating systems, foraging, learning, communication, and agonistic behavior. Prerequisite: Graduate standing in Psychology, or permission of instructor.

PSYCH 503 Core Concepts in Behavior Genetics (4) *O'Donnell, Shoda* Overview of current approaches to genetic analysis in Psychology. Role of genetics in behavioral variation, and in regulating behavioral development. Techniques for quantifying genetic variation, behavioral effects of genes, and patterns of gene expression. Genetic effects on major behavioral differences. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 504 Core Concepts in Behavioral Neuroscience (3) *Bernstein, Buch, Covey, Diaz, Kenney, Kim, Mizumori, Olavarria* Historical and contemporary perspectives in behavioral neuroscience. Current methodologies and research strategies. May include sensory processing, genetics, behavioral neuroendocrinology, developmental neural plasticity, neurobiology of learning and memory, lifespan perspectives on behavioral neurobiology, and psychopharmacology. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 506 Core Concepts in Cognitive Neuroscience (3) *Corina, Osterhout* Combines psychological models of information processing with research techniques in the biomedical sciences. Topics in vision, attention, memory, motor behavior, and language illustrate this integrative approach. Research methods include behavioral, single unit, lesion and neuro-imaging techniques. Prerequisite: graduate standing in Psychology, or permission instructor.

PSYCH 507 Core Concepts in Cognitive Psychology (5) *Bassok* Survey of the major topics in human cognition. Discussion of memory, concepts and categories, language, decision-making, and problem solving. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 508 Core Concepts in Perception (3) *G. Loftus* Current topics in perception, psychophysics, sensory memory, pattern recognition, letter and word perception, and visual masking. Prerequisite: graduate standing in Psychology, or permission of instructor. Offered: Sp.

PSYCH 510 Core Concepts in Social Psychology (4) *Plaks, Shoda* An overview of contemporary theories and research in social psychology, focusing on introducing graduate students to the field as practitioners of social psychological research. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 511 Core Concepts in Personality (3) *Shoda, R. Smith* Review of personality research. Roles of cognitive, affective, motivational, and psychodynamic processes. Critical evaluation of current personality, its antecedents, and its influences over behavior. Attention to role of personality variables in social relationships. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 513 Core Concepts in Biological Basis of Development (4) *Bernstein* Embryological, genetic, physiological, and evolutionary perspectives of human development; biological development in infancy; sensory development and its influence on the development of perception; primate models for human development. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 514 Core Concepts in Early Cognitive and Linguistic Development (4) *Meltzoff, Sommerville* Origins and early development of thought and language. Piagetian theory and modern-day revisions. In depth examination of historical and philosophical bases for current empirical research. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 515 Core Concepts in Personality and Social Development (4) *Carlson* Theories and empirical literature in personality and social development throughout infancy, childhood. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 517 Core Concepts in Systems of Psychotherapy (3) *George* Theory and research of major systems of psychotherapy, including the psychodynamic, behavioral, cognitive, and family systems approaches as an introduction to subsequent practica in clinical psychology. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate standing in psychology, or permission of instructor. Offered: A.

PSYCH 518 Core Concepts in Behavior Disorders (5) *Zoellner* Major types of behavior disorders, with emphasis on clinical manifestations, relevant research, and theoretical perspectives. Required for all graduate students majoring in clinical psychology. Prerequisite: graduate standing in Psychology or permission of instructor. Offered: W.

PSYCH 519 Core Concepts in Behavior Change (5) *Kohlenberg* Behavioral theory and behavioral approaches to treatment. Prerequisite: PSYCH 518 and permission of instructor. Offered: Sp.

PSYCH 522 Laboratory in Statistical Computation I (2) *Miyamoto* Techniques of computation using statistical software on personal computers. Organization of data files, transformations of variables, graphical representations of data, descriptive statistics, elementary inferential statistical analyses. Prerequisite: concurrent enrollment in PSYCH 524 or permission of instructor. Offered: A.

PSYCH 523 Laboratory in Statistical Computation II (2) Techniques of statistical computation using statistical software on personal computers and mainframe computers. Multiple regression, analysis of variance and covariance. Planned and post hoc comparisons and confidence intervals. Data analytic diagnostics for violations of regression assumptions. Prerequisite: PSYCH 522 and PSYCH 524, concurrent enrollment in PSYCH 525, or permission of instructor. Offered: W.

PSYCH 524 Introduction to Statistics and Data Analysis (4) *Miyamoto* Basic concepts of statistical theory and methods of data analysis. Emphasis on the integration of statistical theory, statistical computation, and psychological research methods. Required of all first-year graduate students in psychology. Prerequisite: concurrent enrollment in PSYCH 522 or permission of instructor. Offered: A.

PSYCH 525 Linear Models and Data Analysis (4) Analysis of data in the behavioral sciences. Required of all first-year graduate majors. Prerequisite: PSYCH 522, PSYCH 524; concurrent registration in PSYCH 523, or permission of instructor. Offered: W.

PSYCH 526 Multivariate Statistics (4) *Rudd* An introduction to statistical modeling; interactive data analyses; use of regression, ANOVA, logistic regression, and log-linear models in explanatory studies. Prerequisite: PSYCH 525.

PSYCH 527 Mathematical Modeling for Psychology and the Neurosciences (3) *Rudd* Introduces a collection of mathematical models increasingly important to research in psychology and neuroscience, including random walks, differential equations, linear systems theory, Fourier analysis, nonlinear systems, and neural modeling. Topics illustrated by examples from recent literature. Prerequisite: undergraduate statistics.

PSYCH 528 Practical Methods for Behavioral Research (4, max. 8) *Greenwald* Examination of methodological, practical, and communication problems associated with research on human behavior. Topics include: selecting research problems, use of theory, types of validity, common sense about statistics, when to replicate, dealing with unpredicted results, strategies for presentation and publication. Offered: Sp.

PSYCH 529 Advanced Research Methods (5) *Beauchaine* Surveys advances clinical research methods not covered in the required statistics sequence. Examples include structural equation modeling, hierarchical linear modeling, growth curve modeling, and taxometric analyses. Hands-on experience gained through weekly assignments using each method. Prerequisite: PSYCH 525.

PSYCH 530 Introduction to Latent Variables (4) *Greenwald* Analyses techniques to assess effects of latent variables in presence of error in observed data. Provides experience with statistical tools for confirmatory structural equation modeling and testing of hypotheses concerning causal and other relations among latent variable. Prerequisite: PSYCH 515 or permission of instructor.

PSYCH 531 Research Methods in Clinical and Community Psychology (4) *Lengua* Addresses issues concerning the design and implementation of research in clinical and community psychology. Topics include validity; reliability; experimental, quasi-, and non-experimental designs; causal inference; interpretation of data; and research ethics. Provides students with tools to evaluate research, develop hypotheses, and design rigorous empirical studies. Offered: A.

PSYCH 532 Single Subject Design and Research (3) *Kohlenberg* Single subject designs (reversal, multiple baseline, changing criterion) and their application to clinical cases. Prerequisite: graduate major standing in clinical psychology or permission of instructor. Offered: W.

PSYCH 535 Scientific Writing in Psychology (5, max. 10) *Loesche* Addresses issues in scientific writing and publishing; laboratories assist with writing, and provide feedback on drafts of articles throughout the writing process. Students write a journal article to submit for publication. Other writing projects are also possible with instructor's permission. Credit/no credit only.

PSYCH 536 Grant Preparation in Psychology (3, max. 6) *Mizumori, Teller* Prepare and submit an application for a major national fellowship. Joint registration in PSYCH 598 with faculty advisor is required. Credit/no credit only. Prerequisite: graduate standing Psychology, and permission of instructor.

PSYCH 537 Teaching of Psychology (3) *Passer* Examines issues concerning the teaching of psychology, including educational goals, course development, instructional methods, T.A.-student and T.A.-faculty relations, grading, student diversity, and problem situations. Assignments are designed to enhance students' organizational, presentational, and problem-solving skills. Credit/no credit only. Prerequisite: graduate standing in the Department of Psychology.

PSYCH 538 Interactive Software for Psychological Research (4) *Loftus* Introduction to computing concepts and basic programming skills. Includes principles of programming, the MATLAB programming environment, and the psychophysics toolbox. Data collection and management. Design and program experiments. No prior programming experience needed. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 540 Advances in Psychology (3-5, max. 30) Intensive readings from the current

literature on an emerging topic or theoretical perspective in psychology. Student presentations and discussion. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 541 Advances in Animal Behavior (3-5, max. 30) *Barash, Beecher, Brenowitz, Kyes, O'Donnell* Intensive readings from the current literature on an emerging topic or theoretical perspective in animal behavior. Student presentations and discussion. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 542 Advances in Behavioral Neuroscience (3-5, max. 30) *Buck, Teller* Intensive readings from the current literature on an emerging topic or theoretical perspective in behavior science. Student presentations and discussion. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 543 Advances in Child Clinical Psychology (3-5, max. 30) *Beauchaine, Cauce, Lengua, McMahon* Intensive readings from the current literature on an emerging topic or theoretical perspective in child clinical psychology. Prerequisite: graduate student in Psychology, or permission of instructor.

PSYCH 544 Advances in Clinical Psychology (3-5, max. 30) *Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, McMahon, Smith, Zoellner* Intensive readings from the current literature on an emerging topic or theoretical perspective in clinical psychology. Student presentations and discussion. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 545 Advances in Cognition/Perception(2) *E. Loftus, G. Loftus* Intensive readings from the current literature on an emerging topic or theoretical perspective in cognition/perception. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 546 Advances in Developmental Psychology (3-5, max. 30) *Carlson, Kahn, Meltzoff, Repacholi, Smoll, Sommerville, Teller* Intensive readings from the current literature on an emerging topic or theoretical perspective in Developmental Psychology. Student presentations and discussion. Prerequisite: Graduate standing in Psychology or permission of instructor.

PSYCH 547 Advances in Social/Personality (3-5, max. 30) *Passer* Intensive readings from the current literature on an emerging topic or theoretical perspective in social psychology/personality. Student presentations and discussion Credit/no credit only. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 548 Advances in Quantitative Psychology (3-5, max. 30) *Hunt, Lunneborg* Intensive readings from the current literature on an emerging topic or theoretical perspective in quantitative psychology. Student presentations and discussion. Prerequisite: graduate standing in Psychology or permission of instructor.

PSYCH 549 Seminar in Physiological Psychology (2) *Bernstein, Diaz, Kenney, Teller* Prerequisite: permission of instructor.

PSYCH 550 Seminar in Psychology (1-2, max. 30) Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 551 Seminar in Animal Behavior (1-2, max. 30) *Barash, Beecher, Brenowitz, O'Donnell* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 552 Seminar in Behavioral Neuroscience (1-2, max. 30) *Bernstein, Buck, Covey, Diaz, Kenney, Misumori, Olavarria, Teller* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 553 Seminar in Child Clinical Psychology (1-2, max. 30) *Beauchaine, Cauce, Dawson, Lengua, McMahon* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 554 Seminar in Clinical Psychology (1-2, max. 30) *George, Kohlenberg, Linehan, Marlatt, Smith, Zoellner* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 555 Seminar in Cognition/Perception (1-2, max. 30) *Bassok, Buck, Kerr, Loftus, Rudd, Teller* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 556 Seminar in Developmental Psychology (1-2, max. 30) *Bernstein, Carlson, Meltzoff, Repacholi, Smoll, Teller* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 557 Seminar in Social/Personality (1-2, max. 30) *Brown, Greenwald, Plaks, Shoda* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 558 Seminar in Quantitative Psychology (1-2, max. 30) *Little, Miyamoto, Rudd* Weekly meetings for discussion of current topics. Prerequisite: graduate standing in Psychology, or permission of instructor.

PSYCH 560 Research Strategies (2, max. 30) Group discussions of problems and continuing strategies for ongoing and future research projects. Prerequisite: graduate standing in Psychology, others by permission.

PSYCH 561 Current Trends in Psychology (*, max. 30) Prerequisite: permission of instructor. Offered: AWSpS.

PSYCH 562 Evolutionary Psychology of Gender, Mating and Reproduction (3) *Barash, Beecher, O'Donnell* Reviews evidence for biological factors influencing human mating and reproductive behavior, through application of concepts and theory from animal behavior, behavioral genetics, and evolutionary biology. Offered: W.

PSYCH 563 Developmental Psychology and the Human Relationship with Nature (4) *Kahn* Theories of development used to investigate the ontogenesis of the human relationship with nature. An emphasis on social cognition, children's environmental moral reasoning, the effects of technology in children's lives, and evolutionary theory. Offered: W.

PSYCH 564 Advanced Attitude Theory (5) *Greenwald* Theoretical, methodological, and empirical work on the concept of attitude and its practical applications. Topics include: definition of attitude, measurement of attitudes, information processing theories, functional theories, cognitive structure theories, the self as attitude object, unconscious attitudinal processes. Prerequisite: PSYCH 445; PSYCH 525 or equivalent; or permission of instructor.

PSYCH 565 Quantifying Brain Analysis (3) Covers concepts and applications of statistically unbiased methods for quantifying brain structure. Hands-on learning and application of concepts, sampling strategies and calculations for unbiased stereological measure of the size and number of various brain components.

PSYCH 566 Neural Correlates of Perceptual Cognition (3) *Olavarria* Contribution of sensory systems to perceptual capabilities. Critical review of literature on the neural correlates of abilities such as sensory discrimination, subjective perception, attention, imagery, object and face recognition, and spatial behavior. Some sensory disabilities reviewed. Offered: W.

PSYCH 567 Higher Order Cognition (3) *Bassok* Survey of research on higher-order cognition with an emphasis on theoretical accounts of knowledge representation. Topics include problem solving, inductive and deductive reasoning, hypothesis testing, causal inferences, similarity judgments, and categorization.

PSYCH 568 Cognitive Approaches to Human Memory (3) *E. Loftus* Examination of current topics in human memory from the perspective of cognitive psychology. Prerequisite: PSYCH 355 or permission of instructor. Offered: Sp.

PSYCH 570 Child Clinical Psychology (4) Issues and content of child clinical psychology, promotion of student's beginning work in research. Prerequisite: graduate major or minor standing in child-clinical psychology.

PSYCH 571 Child Psychopathology (5) *McMahon* Broad survey of major categories of child and adolescent disorders. Emphasis on scientific, empirical approach to description, classification, and research literature on these disorders. Required for all graduate students majoring in child clinical psychology. Prerequisite: graduate standing in psychology or permission of instructor.

PSYCH 572 Approaches to Child Treatment (4) *Barrett, Beauchaine, Dawson* Major approaches to child psychotherapy, including specific applications, issues in treatment, and research. Prerequisite: graduate major standing in child-clinical psychology or permission of instructor. Offered: Sp.

PSYCH 573 Psychological Assessment of Children (5) *Dawson* Assessment techniques appropriate to children, including those for infants, special problems of preschool and school-age children; projective tests, family interviews, and target observational assessment; training in administration of selected techniques. Prerequisite: PSYCH 576 and permission of instructor.

PSYCH 574 Community Psychology (4) Overview of key issues and concepts in the field of community psychology. History of field and overview of different models used to conceptualize system-level mental health issues and

delivery systems. Emphasizes theory and research rather than intervention. Prerequisite: psychology graduate student or permission of instructor.

PSYCH 575 Anxiety Disorders (3) Zoellner
General topics related to primary anxiety disorders (panic, OCD, GAD, posttraumatic stress disorder, and specific phobias), including diagnosis, theory, and treatment.

PSYCH 576 Assessment of Intelligence (5) Lengua
Current theory and research on intelligence and intelligence testing; training in administration, scoring, and interpretation of major intelligence tests; ethical issues in assessment. Prerequisite: graduate major standing in child clinical or clinical psychology, or graduate minor standing in child clinical psychology. Offered: Sp.

PSYCH 577 Psychological Assessment of Adults (3)
Training in adult assessment and development of skills in administration, scoring, and interpretation of the Rorschach with some attention to other projective techniques. Prerequisite: PSYCH 576 and permission of instructor.

PSYCH 578 Approaches to Psychological Assessment (4)
Problem-solving approach to psychological assessment; review of psychological tests and procedures and presentation of approaches to their clinical interpretation and use. Required for all graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical psychology. Offered: Sp.

PSYCH 579 Behavioral Assessment (4) Linehan
Research, theory, and technique in behavioral assessment. Emphasis on assessing for change and relationship between assessment and therapy. Interviewing, observational techniques, self-monitoring, simulated environments, and physiological, self-report, and imaginal procedures. Prerequisite: clinical psychology graduate standing and permission of instructor.

PSYCH 580 Minority Mental Health (3) Barrett, George
Surveys topics on mental health and treatment of racial and ethnic minorities. Theory emphases include: models addressing ethnic identity, cross-cultural differences, models of culturally sensitive intervention. Practice emphases include unique psychotherapy strategies for: African-, Asian-, and Latino-Americans, and American Indians. Prerequisite: graduate clinical major standing in psychology or permission of instructor.

PSYCH 581 Cross-Cultural Competency I (2) Barrett, George
Focuses on development of multicultural competence in the provision of psychological services to meet APA guidelines for ethnic, linguistic, and culturally diverse populations. Students address personal development, increase their knowledge of diverse groups, and study effective models of intervention in working with clients of diverse backgrounds. Prerequisite: PSYCH 575.

PSYCH 582 Cross-Cultural Competency II (2) Barrett, George
Third in the graduate multicultural-competence sequence. Focuses on American ethnic minorities, multiracial children and families, social action, and organizational development. Prerequisite: PSYCH 581.

PSYCH 584 Behavioral Methods: Clinical

Interventions (3) Linehan
Provides students with basic skills required for competent practice of cognitive and behavioral therapies. Topics include behavioral skills training, cognitive restructuring, contingency management, and exposure-based procedures. Prerequisite: second year of graduate clinical psychology, social work, psychosocial nursing, or psychiatric residency.

PSYCH 586 Clinical Personality Assessment (3) R. Smith
Use of objective personality inventories in the description of normal and abnormal personality and use of such information in case conceptualization and treatment planning. Minnesota Multiphasic Personality Inventory, Millon Clinical Multiaxial Inventory. Credit/no credit only. Prerequisite: clinical psychology graduate standing.

PSYCH 587 Clinical Methods: Interviewing (2) Fagan
Provides the foundation for developing good clinical skills. Enables students to conduct an initial clinical interview and generate a diagnostic formulation, problem list, and treatment plan after taking a complete history. Limited to and required of all second-year clinical psychology graduate students. Credit/no credit only. Offered: A.

PSYCH 588 Clinical Methods: Ethics (2) Fagan
Enables students to acquire a thorough working knowledge of the American Psychological Association's Ethical Standards for Psychologists; an awareness of Washington state law as it affects psychologists and a knowledge of how to identify and solve ethical dilemmas. Limited to and required of all second-year clinical psychology graduate students. Credit/no credit only. Offered: W.

PSYCH 589 Clinical Supervision (4) Cauce, Dawson, George, Kohlenberg, Marlatt, McMahon, Smith
Supervised psychotherapy involving several individual clients. Separate consultations with instructor for intensive supervision of each case. Occasional meetings in small groups of instructors and students to discuss case material. Assigned readings appropriate to each case with opportunities to discuss these with instructor. Credit/no credit only. Prerequisite: clinical psychology graduate standing and permission of instructor. Offered: AWSpS.

PSYCH 590 Practicum in Psychological Assessment (2)
Demonstration and practice of selected psychological test procedures and interviewing skills. Concurrent registration in 535 required. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Prerequisite: graduate major standing in clinical or child-clinical psychology and permission of instructor.

PSYCH 591 Issues in Clinical Psychology (1, max. 3)
Personal and professional issues in clinical psychology. Required for all first-year graduate students majoring in clinical and child-clinical psychology. Credit/no credit only. Prerequisite: graduate major standing in clinical psychology. Offered: AW.

PSYCH 593 Clinical Practica and Colloquium (1-6, max. 24) Fagan
Required of all clinical psychology graduate students seeing clients in the clinic. Clinical colloquium required of all second-year students, optional for others. Credit/no credit only. Offered: AWS.

PSYCH 594 Advanced Personality Theory (5)

Linehan
Conceptual models of behavioral functioning, cognition, emotion, and environment as organizers of behavior and other critical issues in personality theory. Opportunity to integrate previous courses, research, and practice, and arrive at coherent theoretical framework. Required for graduate majors in clinical psychology.

PSYCH 596 Advanced Teaching Practicum (2, max. 6)
Supervised participation in graduate teaching. Prerequisite: graduate student in Psychology and permission of instructor. Offered: AWSpS.

PSYCH 597 Fieldwork in Clinical Psychology (1-5, max. 36) Baer, Cauce, Dawson, George, Kohlenberg, Linehan, Marlatt, R. Smith
Prerequisite: second-year graduate major standing and permission of departmental faculty.

PSYCH 598 Directed Reading in Psychology (*, max. 30)
Selected topics. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 599 Directed Research in Psychology (1-3, max. 24)
Supervised participation in research. Prerequisite: permission of a supervising psychology faculty member.

PSYCH 600 Independent Study or Research (*)
Offered: AWSpS.

PSYCH 700 Master's Thesis (*)
Offered: AWSpS.

PSYCH 800 Doctoral Dissertation (*)
Offered: AWSpS.

Romance Languages and Literature

French

Credit: The sequence 121, 122, 123 is parallel to 101, 102, 103; students can receive credit for 101 and 121, but not for 102 and 122 or 103 and 123. 101 or 121 cannot be taken for credit after 102, 103, 122, or 123. 134 is a 15-credit intensive course exactly equivalent to 121, 122, 123; a maximum of 15 credits are allowed for 134 and any of 102, 103, 121, 122, and 123. A student who completes 134 cannot later take 101 for credit, but a student who earns credit for 101 can take 134 for 15 additional credits.

FRENCH 101 Elementary (5)
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisite: score of 0-14 on FR TL placement test if French is language of admission.

FRENCH 102 Elementary (5)
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisite: either FRENCH 101 or score of 15-30 on FR TL placement test.

FRENCH 103 Elementary (5)
Methods and objectives are primarily oral-aural. Oral practice in the language laboratory is required. Prerequisite: either FRENCH 102, FRENCH 110, or score of 31-56 on FR TL placement test.

FRENCH 110 Basic French Review (5)
Combines in one quarter the contents of 101 and 102. Designed for students who have studied French in high school but who are not ready for

102. Prerequisite: score of 10-30 on FR TL placement test.

FRENCH 121 French Immersion (5) Methods and objectives primarily interactive based on a multi-media approach using the Reflects method: covers the equivalent of FRENCH 101. Prerequisite: score of 0-14 on FR TL placement test if French is language of admission. Offered: A.

FRENCH 122 French Immersion (5) Methods and objectives primarily interactive based on a multi-media approach using the Reflects method: covers the equivalent of FRENCH 102. Prerequisite: FRENCH 121 or a score of 15-30 on FR TL placement test. Offered: W.

FRENCH 123 French Immersion (5) Methods and objectives primarily interactive based on a multi-media approach using the Reflects method: covers the equivalent of FRENCH 103. Prerequisite: FRENCH 122 or a score of 31-56 on FR TL placement test. Offered: Sp.

FRENCH 134 First-year Intensive French (15) Equivalent of 101, 102, 103. No more than 15 credits allowed for any combination of 101, 102, 103, and 134. Offered: S.

FRENCH 199 Foreign Study — Elementary (4-16, max. 16) Elementary instruction in approved foreign study program. Students who wish to satisfy foreign language proficiency requirement must see the departmental adviser and may be required to take additional courses through 103.

FRENCH 201 Intermediate (5) VLPA Designed to bring students to an intermediate level of proficiency. Emphasis on experiencing the language in context through a multi-media approach. Prerequisite: either FRENCH 103, FRENCH 134, or score of 57-100 on FR TL placement test.

FRENCH 202 Intermediate (5) VLPA Designed to bring students to an intermediate level of proficiency. Emphasis on experiencing the language in context through a multi-media approach. Prerequisite: FRENCH 201.

FRENCH 203 Intermediate (5) VLPA Designed to bring students to an intermediate level of proficiency. Emphasis on experiencing the language in context through a multi-media approach. Prerequisite: FRENCH 202.

FRENCH 207 Second-Year Reading (5) Intermediate vocabulary building and reading of literary texts. Students receiving credit for 207 may subsequently earn credit for lower-division French courses involving other skills.

FRENCH 210 Paris (5) I&S/VLPA Taught in English. Provides an introduction to the art, architecture, politics, and literature of the City of Light.

FRENCH 211 French Masterworks: Ancien Regime in English (5) VLPA *Collins* Introduction to major figures of French culture from the Middle Ages to the eighteenth century, their contributions to the intellectual life of the Western world. Readings include Montaigne, Descartes, Rousseau, Voltaire, and Moliere. In English.

FRENCH 212 French Masterworks: Modern in English (5) VLPA *Collins* Introduction to major figures of French culture from the nineteenth and twentieth centuries. Readings include Balzac, Flaubert, Proust, Sartre, and Celine. In English.

FRENCH 214 The French Fairy Tale Tradition in English (5) VLPA *Delcourt* French fairy tales as a major trend in French literature and a continuing influence on modern fictions and films. Particular attention given to the numerous French women writers of fairy tales at the time of Charles Perrault (seventeenth century) and after. In English.

FRENCH 221 Second-Year French Immersion (5) VLPA Cover the equivalent of second-year French (FRENCH 201, 202, 203) through an alternative "planned immersion" method with video as the central medium of presentation.

FRENCH 222 Second-Year French Immersion (5) VLPA Cover the equivalent of second-year French (FRENCH 201, 202, 203) through an alternative "planned immersion" method with video as the central medium of presentation.

FRENCH 223 Second-Year French Immersion (5) VLPA Cover the equivalent of second-year French (FRENCH 201, 202, 203) through an alternative "planned immersion" method with video as the central medium of presentation.

FRENCH 227 Intermediate Conversational French (2, max. 8) VLPA Practice of intermediate-level French conversational skills through class discussion and oral presentations. Topics oriented toward French culture and current events. Prerequisite: FRENCH 103.

FRENCH 234 Intermediate French Immersion (15) VLPA Covers the equivalent of second-year French (FRENCH 201, 202, 203) through an alternative "planned immersion" method with video as the central medium of presentation. Prerequisite: either FRENCH 103, FRENCH 134, or score of 57-100 on FR TL placement test.

FRENCH 237 Foreign Study Conversational French (2-8, max. 8) VLPA For participants in the Foreign Study Program.

FRENCH 250 History of French Cinema in English (5) VLPA *V. Collins* History of cinema in France from the birth of film, the seventh art, to the present. Socio-historical context of French cinema explored. In English.

FRENCH 297 Foreign Study French Civilization (3/6) VLPA For participants in the Foreign Study Program. Literary tradition, social and cultural values as reflected in literature. Paper (in English) and higher degree of participation for 6 credits. In English.

FRENCH 299 Foreign Study — Intermediate (4-16, max. 16) VLPA Intermediate instruction in approved foreign study program. Evaluation by departmental adviser required to establish proficiency. Further study at 200-level subject to departmental evaluation.

FRENCH 301 Advanced French (5) VLPA Designed to bring students to an advanced level of proficiency in grammar and composition. Emphasis on experiencing the language in context through a multi-media approach. 303 prepares students for literature classes. Prerequisite: either FRENCH 203 or FRENCH 234.

FRENCH 302 Advanced French (5) VLPA Designed to bring students to an advanced level of proficiency in grammar and composition. Emphasis on experiencing the language in context through a multi-media approach. 303

prepares students for literature classes. Prerequisite: FRENCH 301.

FRENCH 303 Advanced French (5) VLPA Designed to bring students to an advanced level of proficiency in grammar and composition. Emphasis on experiencing the language in context through a multi-media approach. 303 prepares students for literature classes. Prerequisite: FRENCH 302.

FRENCH 304 Survey of French Literature: Origins to 1600 (5) VLPA Thematic and formal developments in literature of the period with emphasis on movements and texts in relation to cultural background. Prerequisite: FRENCH 302.

FRENCH 305 Survey of French Literature: 1600-1789 (5) VLPA Emphasis on literary movements and texts in relation to cultural background. Prerequisite: FRENCH 302.

FRENCH 306 Survey of French Literature: 1789 to the Present (5) VLPA Development of modern literature through its most important writers and movements. Prerequisite: FRENCH 302.

FRENCH 308 Foreign Study Composition (3-5, max. 10) VLPA For participants in the Foreign Study Program. Compositions on topical subjects of intermediate difficulty relating to the civilization of the French-speaking countries of Europe. Grammar review as needed. Prerequisite: FRENCH 203.

FRENCH 313 Business Communication in French (5) VLPA Offers students the opportunity to develop French language skills (reading, writing, speaking, and listening) within the context of the French-speaking business world. Business-specific culture emphasized. May be taken in lieu of, or in addition to, 303. Prerequisite: FRENCH 302.

FRENCH 327 Advanced Conversation (2, max. 8) VLPA Not open to students whose native language is French. Prerequisite: FRENCH 203.

FRENCH 337 Foreign Study Conversational French (2-8, max. 8) VLPA For participants in the Foreign Study Program. Prerequisite: FRENCH 203.

FRENCH 378 The Making of Contemporary France (5) I&S/VLPA Study of the historical origins and subsequent development of contemporary problems and characteristics of French government and politics, economy, and society. Prerequisite: FRENCH 203.

FRENCH 390 Supervised Study (2-6, max. 20)

FRENCH 397 Foreign Study French Civilization (3/6) VLPA For participants in the Foreign Study Program. Literary tradition, social and cultural values as reflected in literature. Paper (in French) and higher degree of participation for 6 credits. In French. Prerequisite: FRENCH 203.

FRENCH 406 Advanced French Composition (5) VLPA Extensive guidance in advanced French composition, emphasizing stylistics and grammar. Prerequisite: FRENCH 303.

FRENCH 411 Topics in the Middle Ages (5) VLPA Sixteenth-century literature with emphasis on poetry and the general artistic ambiance. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 412 Topics in Sixteenth Century French Literature (5) VLPA An introduction to major French literary texts of the Sixteenth Century. Prerequisite: FRENCH 303; FRENCH 304.

FRENCH 413 Topics in Seventeenth Century (5) VLPA Seventeenth-century literature, with emphasis on the development of classicism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 414 French Literature of the Eighteenth Century: Enlightenment (5) VLPA Eighteenth-century literature, with emphasis on the development of the Enlightenment ideology. Prerequisite: FRENCH 303; either FRENCH 304, FRENCH 305, or FRENCH 306. May not be repeated after achieving a grade of 2.0.

FRENCH 415 French Literature of the Eighteenth Century: Post-Enlightenment (5) VLPA Eighteenth-century literature, with emphasis on the "dark side of the Enlightenment" and nascent romanticism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 416 French Literature of the Nineteenth Century: Romanticism (5) VLPA Nineteenth-century literature, with emphasis on romanticism and the early manifestations of realism. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 418 French Literature of the Early Twentieth Century (5) VLPA Twentieth-century literature, with emphasis on the period 1900-1939. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 419 French Literature Since World War II (5) VLPA Twentieth-century literature, with emphasis on the period 1939 to the present. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 420 Interdisciplinary Approaches to Literature (5) VLPA Interdisciplinary studies in French literature and culture, focusing on the complex interactions of literature and other disciplines, i.e. philosophy, psychoanalysis, anthropology, architecture. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 306.

FRENCH 421 Psychoanalysis and Literature (5) VLPA Borch-Jacobsen Readings from Freud and French critical writers regarding the relationship between psychoanalysis and literature. Prerequisite: FRENCH 303; FRENCH 306.

FRENCH 422 Literature and the Other Arts (5) VLPA Examines the relationship between text and image in a variety of art forms. Prerequisite: FRENCH 303.

FRENCH 424 Fiction: 1800-1850 (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 425 Fiction: 1850-1900 (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 427 Fiction: Twentieth Century (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 431 Critical Approaches to French Poetry (5) VLPA Interdisciplinary approaches to

French poetry focusing on the intersection of fine art, cultural movements, and the production of literature in the Second Empire and the Third Republic.

FRENCH 432 Critical Approaches to French Fiction (5) VLPA Addresses theory and practice of fiction within the context of a given century or movement. Content varies. Prerequisite: FRENCH 303.

FRENCH 435 Topics in Non-Fiction (5) VLPA Content varies. Prerequisite: FRENCH 303.

FRENCH 441 Quebecois Literature (5) VLPA Readings of novels, plays, and occasionally, poetry. Special attention paid to how Quebecois authors represent in their works the complex socio-political reality of their culture. Conducted in French. French majors required to read and write in French; all others may read and write in English. Prerequisite: FRENCH 303; FRENCH 306. Offered: jointly with SISCA 441.

FRENCH 444 Poetry: Romantic (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 445 Women Writers and Feminist Theory (5) VLPA Focus on French women writers from different periods and places. Gender issues addressed in critical fashion, considering the different historical and ideological contexts in which each of the works were produced. Prerequisite: FRENCH 303.

FRENCH 446 Poetry: Twentieth Century (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 450 Themes in French Literature and Culture (5) VLPA Interdisciplinary studies in French literature and culture, focusing on the construction and representation of gender roles in the French novel from the early eighteenth century. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 451 History and Literature of the French Religious Wars (5) I&S/VLPA Major political, social, and religious movements and events of, and related to, the French religious wars of 1560 to the end of the century, along with the treatment of these in the prose, poetry, and drama of the period. For students receiving French credit, readings must be done in French. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 454 Nonfiction of the Classic Period (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 455 One Author in French Literature/Culture (5, max. 15) VLPA In depth focus on the works of one author in French Literature or Culture. Prerequisite: FRENCH 303.

FRENCH 457 One Decade in French Literature and Culture (5, max. 15) VLPA Content varies. Prerequisite: FRENCH 303.

FRENCH 458 French Art and Literature: Period Studies (5) VLPA Comparative studies of theme and technique in art and literature to illustrate major concerns of a particular period as expressed in these two media. Recommended: background in French literature.

FRENCH 461 Seventeenth-Century Drama (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 463 Nineteenth-Century Drama (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 465 Twentieth-Century Drama (5) VLPA Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 470 Cinema (5) VLPA Major films and figures of French cinema from the beginnings to the present. Prerequisite: FRENCH 303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 472 French-English/English-French Translation (5) VLPA Intense practice of translation from English into French and from French into English. Translation issues specific to French and English syntactic, semantic, and grammatical differences with emphasis on the naturalness of the target language and the accuracy of the translation of the source language. Conducted in French. Prerequisite: FRENCH 303.

FRENCH 481 Twentieth-Century French Novel in English (5) VLPA .

FRENCH 482 French Poetry From Baudelaire to the Present in English (5) VLPA Analysis in English of the major trends and movements in modern French poetry with representative works, from Baudelaire to the poets of the 1950s.

FRENCH 483 Trends in Twentieth-Century Theatre in English (5) VLPA Study of the evolution of the French theatre from the turn of the century to the present. Special emphasis is given the French theatrical scene since World War II.

FRENCH 484 Rabelais and Montaigne in English (5) VLPA Reading and discussion of selected passages from the works of Rabelais and the essays of Montaigne. Background information through informal lectures and outside reading on the two figures as illustrative of the Renaissance in France.

FRENCH 485 Racine and Molière in English (5) VLPA .

FRENCH 486 Literature of the Enlightenment in English (5) VLPA .

FRENCH 487 Nineteenth-Century Fiction in English (5) VLPA .

FRENCH 488 Women in French Literature in English (5) VLPA Masterpieces of French literature are read in an attempt to understand French attitudes toward women. From the sixteenth century, with a concentration on the twentieth century.

FRENCH 490 Honors Seminar (2-5, max. 10) VLPA Special studies in French literature. Required of candidates for honors and distinction in French.

FRENCH 496 Poetry and Song as Elements in French Civilization (5) VLPA Relationship of poetry and music as expressed in the chanson on several periods of French culture. Emphasis on twentieth-century poet-composer-performers. Attention given to the medieval troubadours and to poet-musician collaboration in the Renaissance and later periods. Prerequisite: FRENCH

303; FRENCH 304; FRENCH 305; FRENCH 306.

FRENCH 499 Special Topics (1-5, max. 10)
Topics to meet special needs. Prerequisite: FRENCH 303.

FRENCH 510 Methodology of French Language Teaching (3) Theoretical and practical foundation of teaching French. Major topics include modern theories of language and language acquisition which underlie modern methods of foreign language teaching, teaching techniques, testing, and classroom relations with emphasis on the multiple-approach direct method. Required for beginning French Teaching Assistants. Credit/no credit only.

FRENCH 515 French Literature of the High Middle Ages (5, max. 10) Old French literature, from the beginning to 1315. Prerequisite: permission of instructor.

FRENCH 516 Middle French Literature (5, max. 10) French literature from 1315 to 1500. Prerequisite: permission of instructor.

FRENCH 520 Renaissance Prose: Rabelais (5)

FRENCH 521 Renaissance Prose: Montaigne (5)

FRENCH 523 Studies in Fiction: 1660-1800 (5, max. 10)

FRENCH 525 Studies in Fiction: 1850-1900 (5, max. 10)

FRENCH 526 Studies in Fiction: 1900-1950 (5, max. 10)

FRENCH 530 Studies in Renaissance Poetry (5, max. 10)

FRENCH 532 Studies in Nineteenth-Century Poetry (5, max. 10)

FRENCH 534 Studies in Twentieth-Century Poetry (5, max. 10)

FRENCH 541 History of the French Language (5) Survey of the phonological, morphological, and syntactical development of the French language from its origins to the present.

FRENCH 542 History of the French Language (5) Survey of the phonological, morphological, and syntactical development of the French language from its origins to the present.

FRENCH 555 French Nonfiction (5, max. 10)

FRENCH 561 Studies in Seventeenth-Century Drama (5, max. 10)

FRENCH 565 Studies in French Drama (5, max. 10) Studies in French drama, sixteenth to twentieth centuries.

FRENCH 570 Seminar in Cinema (5, max. 10)
Prerequisite: permission of instructor.

FRENCH 575 Literary Criticism (5)

FRENCH 576 Critical Methodology (5) Basic scholarly tools of bibliography; historical review of literary doctrine; an introduction to critical methodology.

FRENCH 577 Modern Critical Methods (5)
Modern critical methodology and theory.

FRENCH 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

FRENCH 591 Literary Problems: Middle Ages (5, max. 10)

FRENCH 592 Literary Problems: Renaissance (5, max. 10)

FRENCH 593 Literary Problems: Seventeenth Century (5, max. 10)

FRENCH 594 Literary Problems: Eighteenth Century (5, max. 10)

FRENCH 595 Literary Problems: Nineteenth Century (5, max. 10)

FRENCH 596 Literary Problems: Twentieth Century (5, max. 10)

FRENCH 600 Independent Study or Research (*)

FRENCH 700 Master's Thesis (*) Credit/no credit only.

FRENCH 800 Doctoral Dissertation (*) Credit/no credit only.

Italian

ITAL 101 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Offered: A.

ITAL 102 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Prerequisite: either ITAL 101 or score of 15-30 on IT TL placement test. Offered: W.

ITAL 103 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Prerequisite: either ITAL 102, ITAL 111, or score of 31-56 on IT TL placement test. Offered: Sp.

ITAL 108 Intensive Italian Grammar and Reading (5) Intensive two-quarter presentation of Italian grammar with emphasis on reading Italian texts. For persons who require solid reading knowledge of Italian or who plan to study in Italy.

ITAL 111 Accelerated First-Year Italian (10) Intensive version of 101 and 102. Designed for highly motivated students. Offered: A.

ITAL 113 Accelerated First-Year Italian (10) Intensive version of 102 and 103. Design for highly motivated students. Offered: W.

ITAL 127 Beginning Conversational Italian (2, max. 6) Practice of beginning-level Italian conversational skills through class discussions and oral presentations. Topics vary. Not open to native speakers.

ITAL 134 Intensive First-Year Italian (15) An intensive language course equivalent to 101, 102, 103, designed for highly motivated students. Not open for credit to students who have taken 102 and 103. Offered: S.

ITAL 199 Foreign Study — Elementary (4-16, max. 16) Elementary instruction in approved foreign study program. Students who wish to

satisfy foreign language proficiency requirement must see the departmental adviser and may be required to take additional courses through 103.

ITAL 201 Intermediate (5) VLPA Intensive speaking, reading, and writing. Functional review of grammar. Prerequisite: either ITAL 103, ITAL 113, ITAL 134, or score of 57-100 on IT TL placement test.

ITAL 202 Intermediate (5) VLPA Intensive speaking, reading, and writing. Functional review of grammar. Prerequisite: ITAL 201.

ITAL 203 Intermediate (5) VLPA Intensive speaking, reading, and writing. Functional review of grammar. Prerequisite: ITAL 202.

ITAL 208 Intensive Italian Grammar and Reading (5) VLPA Intensive two-quarter presentation of Italian grammar with emphasis on reading Italian texts. For persons who require solid reading knowledge of Italian or who plan to study in Italy.

ITAL 227 Intermediate Conversational Italian (2, max. 6) VLPA Practice of intermediate-level Italian conversational skills through class discussions and oral presentations. Topics vary. Not open to native speakers. Prerequisite: ITAL 103.

ITAL 234 Intensive Second-Year Italian (15) VLPA Intensive language course designed for highly motivated students. Equivalent to 201, 202, 203. Prerequisite: either ITAL 103, ITAL 113, ITAL 134, or score of 57-100 on IT TL placement test. Offered: S.

ITAL 250 Rome (5) I&S/VLPA Focuses on Rome as an historical, intellectual, and artistic world center. Literary and historic documents, visual arts, architecture, film, and opera will be used to explore the changing paradigms of the Eternal City. In English. Offered: jointly with ART H 250/HSTEU 250.

ITAL 299 Foreign Study — Intermediate (4-16, max. 16) VLPA Intermediate instruction in approved foreign study program. Evaluation by departmental adviser required to establish proficiency. Further study at 200-level subject to departmental evaluation.

ITAL 301 Advanced Syntax and Composition (5) VLPA Prerequisite: either ITAL 203 or ITAL 234.

ITAL 302 Advanced Syntax and Composition (5) VLPA Prerequisite: ITAL 301.

ITAL 303 Italian Stylistics (5) VLPA Functional grammar review; creative written and oral composition and reading, with special attention to problems of style. Prerequisite: ITAL 302.

ITAL 318 Italian Literature in English (5) VLPA

ITAL 319 The Italian Short Story in English (5) VLPA The short story from the Novellino and Boccaccio to modern masters of the form. The translations are studied both as examples of narrative technique and as reflections of particular moments in Italian cultural history.

ITAL 327 Advanced Conversation (2, max. 8) VLPA Not open to students whose native language is Italian. Prerequisite: ITAL 203.

ITAL 341 Italian and American Poetry in Translation (5) VLPA Introduction to basic

concepts and skills required for Italian-to-English translation. Examines the main aspects of contrastive grammar and stylistics used in translation, providing practical opportunities to incorporate and apply the material. Exposure to a variety of translation fields. Prerequisite: ITAL 302, which may be taken concurrently.

ITAL 342 Advanced Italian Composition and Essay Writing (5) VLPA *Azzolini* Addresses issues of syntax and grammar, register and style, and advanced vocabulary for academic writing. Teaches students to write a cogent, well-structured essay for upper-level literature classes in Italian. Writing intensive. Conducted in Italian (some material in English). Prerequisite: ITAL 302, which may be taken concurrently.

ITAL 351 Contemporary Italian Culture (5) Italian culture from the 1980s to the present, with discussion of major events of the period and readings from fiction, political manifestos, song lyrics, etc. Emphasis on recent linguistic developments, changed role of women, meaning of multiculturalism in Italy, and the spread of global culture. Conducted in Italian. Prerequisite: ITAL 203.

ITAL 352 Italian Cultural History (5) I&S Italian history and culture from the thirteenth to the twentieth century, with discussion of the major historical and cultural events. Readings from selected bibliography and historical documents, literature, etc. Emphasis on the historical context of the most significant aspects of Italian culture through the centuries. Conducted in Italian. Prerequisite: ITAL 203.

ITAL 366 Italian Society in Film and Literature (5, max. 15) I&S/VLPA *Sbragia* Studies the evolution of Italian postwar society through the analysis of film and literature as well as critical, historical, and sociological readings.

ITAL 384 Renaissance Literature of Italy in English (3) VLPA .

ITAL 390 Supervised Study (2-6, max. 20) .

ITAL 395 Italian Cultural History (5) I&S/VLPA Explores Italian cultural history through a variety of literary and other textual traditions. Prerequisite: ITAL 302; may not be repeated.

ITAL 399 Foreign Study: Advanced (4-16, max. 16) VLPA Advanced instruction in approved foreign study program.

ITAL 400 The Development of the Italian Language (5) VLPA Historical survey of Italian phonology, morphology, and syntax. Evolution of the language is illustrated with study of pertinent documents from various periods. Prerequisite: either ITAL 303; LING 400 or ROLING 401. Offered: jointly with LING 419.

ITAL 401 Medieval Italian Readings (5) VLPA Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions. Prerequisite: ITAL 302.

ITAL 402 Early Modern Italian Readings I (5) VLPA Readings in Italian Quattro/Cinquecento, covering the period of the Renaissance. Prerequisite: ITAL 302.

ITAL 403 Early Modern Italian Readings II (5) VLPA Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature. Prerequisite: ITAL 302.

ITAL 404 Modern Italian Readings I (5) VLPA Readings in Italian Ottocento, covering the period of Romanticism. Prerequisite: ITAL 302.

ITAL 405 Modern Italian Readings II (5) VLPA Readings in Italian Novecento, covering the work of major Italian twentieth-century authors. Prerequisite: ITAL 302.

ITAL 413 Literature of the Renaissance: Quattrocento (5) VLPA The early Renaissance. Humanism; writings of Lorenzo de' Medici, Poliziano, Belcari, Alberti, Masuccio, Sannazzaro, Pulci, Boiardo. Prerequisite: ITAL 302.

ITAL 414 Literature of the Renaissance: Cinquecento (5) VLPA The high Renaissance. Bembo and the Petrarchans, Machiavelli, Guicciardini, Castiglione, Ariosto, Guarini, Tasso. Prerequisite: ITAL 302.

ITAL 423 Seventeenth-Century Italian Literature (5) VLPA New sciences and new poetics: Campanella, Sarpi, Della Valle, Marino, Tesauro, Bartoli, Galileo, Redi. Prerequisite: ITAL 302.

ITAL 424 Eighteenth-Century Italian Literature (5) VLPA Survey of eighteenth-century literature — the melodrama, drama and poetry: Metastasio, Goldoni, Alfieri, Parini, Monti, and Foscolo. Prerequisite: ITAL 303.

ITAL 431 Italian Theater (5) VLPA The development of Italian theater from the Renaissance to the twentieth century. Prerequisite: ITAL 303.

ITAL 450 The Romantic Movement (5) VLPA Beginning with an examination of the pre-romantic works of Ugo Foscolo, focuses on the literary and critical writings of Alessandro Manzoni and Giacomo Leopardi. Discusses the Romantic movement in Italy within the context of European Romanticism. Reference made to later variations on Romantic themes. Prerequisite: ITAL 303.

ITAL 460 Verismo (5) VLPA The development of Verismo with extensive readings from its main exponents—Capuana, Verga, Serao, Deledda, Fucini, and d'Annunzio. Prerequisite: ITAL 302.

ITAL 465 Contemporary Italian Narrative (5, max. 15) VLPA Critical reading of selected modern exponents of the short story and novel. Prerequisite: ITAL 302.

ITAL 466 Italian Society in Cinema and Literature in Italian (5, max. 15) I&S/VLPA *Sbragia* Studies the evolution of Italian postwar society through the analysis of film and literature as well as critical, historical, and sociological readings. Offered in Italian. Prerequisite: ITAL 302.

ITAL 470 Dante (5) VLPA Introduction to Dante's *Commedia* and minor works, conducted in Italian. Prerequisite: ITAL 303.

ITAL 475 Italian Fascism: Architecture and Power (5) I&S/VLPA Fascism in Italy as studied within the broader European context of nationalism, imperialism, and modernization, with particular emphasis on the arts — literature, film, architecture, and urbanism. Offered: jointly with ART H 495; A.

ITAL 480 Dante's Comedy in English (5) VLPA Introduction to Dante's *Comedy*. Considers

formal, structural, linguistic, literary, historical, cultural, philosophical, and theological issues raised by the text. Discusses the main currents of twentieth-century Dante criticism.

ITAL 481 Dante's Comedy in English (5) VLPA Second half of a two-quarter series. Close study of Dante's *Purgatory* and *Paradiso* and retrospective reading of *Inferno*. Explores Dante's concept of art, both human and divine, as it is developed in and defines the poem. Prerequisite: ITAL 480.

ITAL 482 The Decameron in English (5) VLPA An integral reading of the *Decameron*, with some consideration of its place in world literature and as an expression of the culture of its time.

ITAL 490 Proseminar in Italian Literature (3-5) VLPA Intended to help the student achieve a mature critical mastery of Italian literature. Prerequisite: ITAL 302.

ITAL 499 Special Topics (1-5, max. 10) Topics to meet special needs. Prerequisite: ITAL 302.

ITAL 501 Medieval Italian Readings (5) Yowell Exploration of medieval Italian cultural history through a broad variety of literary and other textual traditions.

ITAL 502 Early Modern Italian Readings I (5) Readings in Italian Quattro/Cinquecento over the period of the Renaissance. Covers major intellectual, literary, and cultural movements and figures of the period, including humanistic rediscovery of Graeco-Roman models, chivalric poems, comic theater.

ITAL 503 Early Modern Italian Readings II (5) Scalabrini Readings in Italian Sei/Settecento, covering the periods of Baroque and Enlightenment literature.

ITAL 504 Modern Italian Readings I (5) Sbragia, Scalabrini Readings in Italian Ottocento, covering the period of Romanticism.

ITAL 505 Modern Italian Readings 2 (5) Sbragia, Scalabrini Readings in Italian Novecento, covering the work of the major Italian twentieth-century authors.

ITAL 514 Dante (5, max. 10) .

ITAL 531 Italian Theater (5) The development of Italian theater from the Renaissance to the Twentieth Century. Individual conferences with lecturing professor. Prerequisite: graduate students only.

ITAL 570 Seminar in Cinema (5) Studies in various areas of Italian cinema, concentrating on major directors, critics, and movements. Prerequisite: permission of instructor.

ITAL 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of instructor.

ITAL 591 Literary Problems: Middle Ages and Fourteenth Century (5, max. 10) .

ITAL 592 Literary Problems: Renaissance (5, max. 10) .

ITAL 593 Literary Problems: Early Modern (5, max. 10) .

ITAL 594 Literary Problems: Eighteenth Century (5, max. 10) .

ITAL 595 Literary Problems: Nineteenth Century (5, max. 10) .

ITAL 596 Literary Problems: Twentieth Century (5, max. 10) .

ITAL 600 Independent Study or Research (*) .

Portuguese

PORT 101 Elementary (5) Methods and objectives are primarily oral-aural. Covers all major elements of Portuguese grammar.

PORT 102 Elementary (5) Methods and objectives are primarily oral-aural. Covers all major elements of Portuguese grammar. Prerequisite: PORT 101.

PORT 103 Elementary (5) Methods and objectives are primarily oral-aural. Covers all major elements of Portuguese grammar. Prerequisite: PORT 102.

PORT 105 Intensive Portuguese for Spanish Speakers (6) Covers the verbal system and major grammatical points. Does not satisfy Foreign Language Requirement. Prerequisite: SPAN 203.

PORT 201 Intermediate (5) VLPA Modern texts, compositions, conversation, and a systematic review of grammar. Prerequisite: either PORT 103 or PORT 105.

PORT 202 Intermediate (5) VLPA Modern texts, compositions, conversation, and a systematic review of grammar. Prerequisite: PORT 201.

PORT 203 Intermediate (5) VLPA Modern texts, compositions, conversation, and a systematic review of grammar. Prerequisite: PORT 202.

PORT 301 Grammar and Lexicon (3) VLPA Prerequisite: PORT 203.

PORT 302 Grammar and Lexicon (3) VLPA Prerequisite: PORT 301.

PORT 310 Introduction to Lusophone Literature (3) VLPA Introduction to the studies of Lusophone literature and culture.

PORT 335 Twentieth Century Brazilian Fiction in English (5, max. 10) VLPA Reading texts in connection with cultural and theoretical issues.

Romance Languages and Literature

ROMAN 411 Critical Approaches to Romance Literature (5) VLPA Explores theoretical as well as fictional texts in a least two Romance languages.

ROMAN 593 Literary Problems: Early Modern Period (5) .

ROMAN 596 Problems in Comparative Contemporary Literary Studies (5) Seminar exploring contemporary literary thought through theoretical and/or creative literature. A selection of texts from at least two Romance languages and literary traditions. Prerequisite: competence in at least two Romance languages; completion of several upper division literature courses; some familiarity with critical methodologies.

ROMAN 600 Independent Study or Research (*) Credit/no credit only.

ROMAN 700 Master's Thesis (*) Credit/no credit only.

ROMAN 800 Doctoral Dissertation (*) Credit/no credit only.

Romanian

RMN 401 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Offered: jointly with ROMN 401; A.

RMN 402 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Prerequisite: RMN/ROMN 401. Offered: jointly with ROMN 402; W.

RMN 403 Elementary Romanian (5) Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: RMN/ROMN 402. Offered: jointly with ROMN 403; Sp.

RMN 404 Advanced Romanian (5) VLPA Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 403. Offered: jointly with ROMN 404; A.

RMN 405 Advanced Romanian (5) VLPA Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 404. Offered: jointly with ROMN 405; W.

RMN 406 Advanced Romanian (5) VLPA Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: RMN/ROMN 405. Offered: jointly with ROMN 406; Sp.

Spanish

SPAN 101 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Prerequisite: score of 0-15 on SP100A placement test if Spanish is language of admission.

SPAN 102 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Prerequisite: either SPAN 101, or score of 16-44 on SP100A placement test.

SPAN 103 Elementary (5) Methods and objectives are primarily oral-aural. Language laboratory is required. Prerequisite: either SPAN 102, SPAN 110 or score of 45-69 on SP100A placement test.

SPAN 110 Basic Spanish Review (5) Covers the equivalent of 101 and 102 to prepare for 103. May not be taken in addition to 101 or 102. Prerequisite: score of 10-44 on SP100A placement test. Offered: AWSp.

SPAN 121 Spanish Immersion (5) Covers the equivalent of elementary Spanish (SPAN 101, 102, 103) through an alternative "planned immersion" method with video as the central medium of presentation. Prerequisite: score of 0-

15 on SP100A placement test if Spanish is language of admission.

SPAN 122 Spanish Immersion (5) Covers the equivalent of elementary Spanish (SPAN 101, 102, 103) through an alternative "planned immersion" method with video as the central medium of presentation. Prerequisite: SPAN 121.

SPAN 123 Spanish Immersion (5) Covers the equivalent of elementary Spanish (SPAN 101, 102, 103) through an alternative "planned immersion" method with video as the central medium of presentation. Prerequisite: SPAN 122.

SPAN 134 Intensive First-Year Spanish (15) Equivalent of 121, 122, 123. Employs "planned immersion" method with video as the central medium of presentation. Not open for credit to students who have taken 121, 122, 123 or 102, 103. Offered: S.

SPAN 199 Foreign Study — Elementary (2-16, max. 16) Elementary instruction in approved foreign study program. Students who wish to satisfy foreign language proficiency requirement must see the departmental adviser and may be required to take additional courses through 103.

SPAN 201 Intermediate (5) VLPA Intensive practice in speaking, reading, and writing. Review of Spanish grammar. Oral practice based on literary and cultural readings. Prerequisite: either SPAN 103, SPAN 123, SPAN 134, score of 70-100 on SP100A placement test, minimum score of 51 on SP TL placement test, or score of 0-75 on SP200A placement test.

SPAN 202 Intermediate (5) VLPA Intensive practice in speaking, reading, and writing. Review of Spanish grammar. Oral practice based on literary and cultural readings. Prerequisite: either SPAN 201 or score of 76-145 on SP200A placement test.

SPAN 203 Intermediate (5) VLPA Intensive practice in speaking, reading, and writing. Review of Spanish grammar. Oral practice based on literary and cultural readings. Prerequisite: either SPAN 202, SPAN 210, or score of 146-165 on SP200A placement test.

SPAN 205 Culture of Andalusia (5) I&S/VLPA Introduction to the culture and society of Andalusia, Southern Spain, regional vs. national identity, syncretism of Arab, Jewish, and Christian cultures, and a variety of contemporary cultural manifestations, among them Carnival, flamenco, the Alhambra, and contemporary literature and cinema. Of particular interest to students considering study abroad in Cadiz. Prerequisite: SPAN 202.

SPAN 206 Arts and Culture of Oaxaca (3) I&S/VLPA *Steele* Introduction to the contemporary culture of Oaxaca, Mexico, particularly painting, folk arts, and Days of the Dead, in the context of recent Mexican politics and society. Prerequisite: SPAN 103, which may be taken concurrently.

SPAN 210 Accelerated Intermediate Spanish (10) VLPA Merges SPAN 201 and SPAN 202. Designed to build listening, speaking, reading, and writing skills and to expand knowledge of culture and literature of the Spanish-speaking world. Combines classroom experience with accelerated Web-enhanced activities provided through Spain's *Instituto Cervantes*. Prerequisite: either SPAN 103, SPAN 123, or SPAN 134.

SPAN 299 Foreign Study — Intermediate (2-16, max. 16) VLPA Intermediate instruction in approved foreign study program. Further study at 200 level subject to placement test score.

SPAN 301 Grammar and Lexicon (5) VLPA Prerequisite: either SPAN 203 or score of 166-175 on SP200A placement test.

SPAN 308 Spanish for Reading Knowledge I (5) VLPA Intended primarily for graduate students. Emphasis on developing reading comprehension of Spanish texts which are pertinent to graduate student's field of research. Credit may not be applied toward Spanish major.

SPAN 309 Spanish for Reading Knowledge II (5) VLPA Intended primarily for graduate students. Emphasizes developing reading comprehension of Spanish texts which are pertinent to graduate student's field of research. Credit may not be applied toward Spanish major. Prerequisite: SPAN 308.

SPAN 310 Accelerated Intermediate-Advanced Grammar and Lexicon (10) VLPA Intensive Web-enhanced grammar and writing, combining SPAN 301 and SPAN 302. Designed to develop skills at the intermediate-advanced level in areas of listening, speaking, reading, and writing. Prerequisite: SPAN 203.

SPAN 312 Creative Writing in Spanish (3) I&S O'Hara Creative writing for students who have finished third year and who have literary interests, as well as a solid command of grammar. Prerequisite: either SPAN 303 or SPAN 316.

SPAN 314 Spanish for Bilingual/Heritage Students (5) VLPA *Gillman* Provides bilingual students whose formal education has primarily been in English with the skills necessary to succeed in upper-division Spanish classes. Intensive review of grammar, readings of literary and journalistic texts, Web-based exercises, writing review, and a play to enhance their verbal skills.

SPAN 315 Spanish for Bilingual/Heritage Students (5) VLPA *Doremus, Gillman* Emphasizes reading, with attention to problems particular to Spanish-heritage students. Emphasis on critical reading, vocabulary expansion, and grammar review. Prerequisite: SPAN 314.

SPAN 316 Stylistics and Composition for Heritage Students (5) VLPA Emphasis on the process of writing essays to help students develop a notion of style in Spanish, with attention to problems particular to Spanish heritage students. Prerequisite: SPAN 315 Offered: Sp.

SPAN 317 Spanish Masterworks in English Translation (5) VLPA Spanish literary masterpieces of the twelfth to sixteenth centuries, in English translation, with consideration of their background and influence.

SPAN 318 Spanish Masterworks in English Translation (5) VLPA Spanish literary masterpieces of the seventeenth to twentieth centuries, in English translation, with consideration of their background and influence.

SPAN 320 Contemporary Latin American Literature in English Translation (3) VLPA Selected texts of contemporary Latin American literature, including examples of magical realism,

the New Novel, and Central American poetry, in their sociohistorical context.

SPAN 351 Poetry (3) VLPA Generic study of Spanish poetry. Prerequisite: either SPAN 302, SPAN 310, or SPAN 315, any of which may be taken concurrently.

SPAN 353 Cervantes' Don Quixote in English (5) VLPA Cervantes's *Don Quixote de la Mancha*: close study of this comic masterpiece, and the life, times, and works of its author. Consideration of the work's enduring influence and vitality.

SPAN 390 Supervised Study (2-6, max. 20) .

SPAN 400 The Syntactic Structure of Spanish (5) VLPA *Strozer, Zagona* Scientific study of the syntax of Spanish: structure of phrases, transformationally derived structures, grammatical relations, principles of interpretation. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 400.

SPAN 401 The Morphological Structure of Spanish (5) VLPA *Strozer, Zagona* Principles of word formation, including derivational and inflectional morphology. Relationship between inflectional morphology and other components of grammar. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 401.

SPAN 402 The Phonological Structure of Spanish (5) VLPA *Strozer, Zagona* Phonological component of the generative grammar of Spanish; representations of syllabic and segmental units, phonological rules, distinctive features and their articulatory correlates. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 402.

SPAN 403 The Evolution of the Spanish Language (5) VLPA *Zagona* Historical survey of Spanish phonology, morphology, and syntax, from Latin origins to the modern language. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 403.

SPAN 406 Advanced Spanish Grammar (5) VLPA Problems of Spanish grammar. Differences from English grammar. Techniques for the effective teaching of Spanish. Prerequisite: either SPAN 303 or SPAN 316; SPAN 323. Offered: jointly with SPLING 406.

SPAN 407 Dialects of World Spanish (5) Introduction to dialectal variants of Spanish. Considers standardization and the real academia; variation and change; pragmatics and politeness; Spanish in contact; sound, word formation, and grammar variation. Taught in Spanish. Prerequisite: either SPAN 301 or SPAN 314; either SPAN 323, LING 200, or LING 400. Offered: jointly with SPLING 407.

SPAN 408 Spanish Translation Workshop (5) VLPA Intensive practice in translation to and from Spanish. Texts include literary prose, poetry, expository writing, newspaper and magazine articles. Problems of standard versus colloquial language, transposition of cultural references, concept of fidelity in translation. Prerequisite: either SPAN 303 or SPAN 316; SPAN 323; recommended: SPAN 406.

SPAN 409 Spanish Phonetics (5) VLPA Analysis of sounds: training in pronunciation, intonation, and close transcription of Spanish language in its modalities. Prerequisite: either SPAN 301 or SPAN 314; either ANTH 203, LING 200, 201, 203, LING 400, or SPAN 323. Offered: jointly with SPLING 409.

SPAN 414 Spanish Literature: Eighteenth Century (5) VLPA Prerequisite: Either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 415 Spanish Literature: Nineteenth Century (5) VLPA Prerequisite: Either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 416 Spanish Literature: 1900-1936 (5) VLPA Spanish literature of the twentieth century prior to the Civil War (1900-1936). Concentration on Generations of 1898 and 1927. Prerequisite: Either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 417 Spanish Literature From 1940 to the Present (5) VLPA Prerequisite: Either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 420 Spanish Poetry: Origins Through the Fifteenth Century (5) VLPA Prerequisite: Either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 423 Spanish Poetry: The Golden Age, Sixteenth Through Seventeenth Centuries (5) VLPA Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 424 Hispanic Poetry (5) VLPA Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Becquer to Hernandez. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 425 Hispanic Poetry (5) VLPA Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Becquer to Hernandez. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 426 Hispanic Poetry (5) VLPA Modern lyric poetry of the Hispanic world. The period studied extends from 1870 to 1936 and deals with thirteen major poets, from Becquer to Hernandez. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 433 Golden Age Prose (5) VLPA Representative, and outstanding, prose works of sixteenth- and seventeenth-century Spain. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 436 Spanish Novel of the Nineteenth Century (5) VLPA Representative works of Galdos, Clarn, Pereda, Valera, and Blasco Ibanez. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 437 Spanish Novel: 1900-1936 (5) VLPA Spanish novel from the generation of 1898 to the

beginning of the Civil War (1936). Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 438 Spanish Novel: 1939 to the Present (5) VLPA Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 439 Women Writers (5) I&S/VLPA Feminist analysis of selected texts by Chicana/Latina writers in the United States as well as by Spanish-American, Luso-Brazilian and/or Spanish women writers in their specific socio-historical contexts. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 440 Spanish Drama: 1150-1600 (5) VLPA From the beginning to Lope de Vega. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 441 Spanish Drama: 1600-1635 (5) VLPA Spanish theatre of the seventeenth century, with emphasis on Lope de Vega. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 445 The Modern Theatre in Spain, 1700-1900 (5) VLPA Literature and historical context of Spain's theatre in the eighteenth and nineteenth centuries. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 446 The Modern Theatre in Spain, 1900-1936 (5) VLPA Major currents and literature of Spain's theatre in this century, up to the Spanish Civil War in 1936. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 447 Spanish Theatre Since the Civil War (5) VLPA Works of Spain's major dramatists of the postwar period. Special attention given to the social and political context of the theatre in Spain under the Franco regime. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 449 Spanish Drama and Play Production (5, max. 10) VLPA Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 453 Cervantes and His Times (5) VLPA Study of Cervantes and his moment in Spanish history, with special attention to his cultural and artistic environment. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 461 Cultural Background of Latin American Literature (5) VLPA Survey of ideas and art forms and their relationship to literature in four periods: pre-Columbian, colonial, early independence, and twentieth century. Prerequisite: either SPAN 303 or SPAN 316; either SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303.

SPAN 462 Early Spanish Civilization (5) I&S/VLPA Development of Spanish society and art forms from early times to 1700. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 463 Spanish Civilization Since 1700 (5) I&S/VLPA Spanish civilization and its major

artistic products since 1700. Major moments in the development of Spanish society and intellectual life as reflected in music, painting, and especially literature. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 464 Chicana Expressive Culture (5) I&S/VLPA Expressive culture of Mexican women in United States. Cultural and artistic practices in home, film, literary (print, oral) performing and visual arts. Focuses on ways Chicana visual artists re-vision traditional iconography. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 465 Contemporary Chicano Literature (5) VLPA Examination of one or more problems, themes, and/or figures in the developing body of Chicano literature. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 466 Chicano Literature: Fiction (5) VLPA Nineteenth- and early twentieth-century fiction, as well as contemporary works, are examined in attempts to trace the development of Chicano fiction in the proper historical trajectory. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 467 Spanish Women (5) I&S/VLPA Women's culture in Spain, focusing on women's experience during Civil War; persecution and censorship of women activists, artists, intellectuals during Franco years; changes in women's culture brought about by reintroduction of democracy; major issues addressed by contemporary Spanish feminists. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303.

SPAN 468 Latin American Women (5) I&S/VLPA The elaboration of discourses of identity in relation to gender, ethnicity, social class, and nationality, by women writers from South America, Mexico, Central America, and the Caribbean. Testimonial literature, literature and resistance, women's experimental fiction. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303. Offered: jointly with WOMEN 468.

SPAN 469 Concepts of Cannibalism in the Colonial World (5) I&S *Barbon* Study of textual and iconographic representations of American cannibalism in the 16th and 17th century. Introduction to research produced by literary critics, anthropologists, and historians. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 469.

SPAN 473 Latin American Fiction: Nineteenth Century (5, max. 15) VLPA Study of prose fiction in Latin America in the nineteenth century. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 474 Latin American Fiction: Twentieth Century (5) VLPA Study of prose fiction in Latin America in the twentieth century. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 475 Latin American Poetry: Colonial Through Nineteenth Century (5) VLPA Poetic movements of the seventeenth, eighteenth, and nineteenth centuries in Spanish American, Renaissance, baroque, neoclassicism, romanticism, and modernism. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 476 Contemporary Latin American Poetry (5) VLPA Evolution of Latin American poetry, from postmodernism and vanguardism to the most recent poetic expression. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 477 Latin American Essay (5) VLPA Literary expression of ideas in Latin American countries, nineteenth and twentieth centuries. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 478 Modern Latin American Theater (5) VLPA Study of the origin, development, and achievements of Latin American theater with an overview of its history prior to the twentieth century. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 479 The City and Latin American Literature: Points of Departure (5) VLPA/I&S *O'Hara* Representations of Latin American, United States, and European cities by Latin American authors, and of Latin American and Latino cities by authors from other literary traditions. The literary relation of urbanization to modernization, globalization, exile, and alienation. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 480 Spanish Medieval Literature (5) VLPA Principal literary works of the Spanish Middle Ages in the context of evolving intellectual, spiritual, and artistic climates of the period. Covers the evolution of narrative and lyric prose and verse in both their traditional and learned manifestations. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 481 Sixteenth- and Seventeenth-Century Spanish Literature (5) VLPA Spanish literature of the sixteenth and seventeenth centuries. Close study of key texts from all genres as well as their socio-historical contexts. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 482 Eighteenth- through Twentieth-Century Spanish Literature (5) VLPA Survey of Spanish literature since 1700, and its historical context. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 483 Latin American Literature: Origins to Independence (5) VLPA The elaboration of discourses of legitimization by the Spanish conquistadores, and of resistance and accommodation by native and mestizo peoples; the development of a New World Baroque aesthetic; literatures of independence from Spain and of nation-building. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 484 Latin American Literature: Modernismo to the Present (5) VLPA Principal literary movements of Latin America, late nineteenth century to the present, with particular emphasis on poetry and narrative: modernismo, postmodernismo, the vanguard, nueva and novísima narrativa. Includes essays and autobiographical writings to help place the literary works in socio-historical perspective. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 485 Cultural Studies of Latin America (5) I&S/VLPA Identity, representation, and transculturation in Latin American popular culture. Topics vary but may include cinema, folk art, and historical, ethnographic, and travel writing. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 485.

SPAN 486 Photography and Cultural Studies in Latin America (5) I&S/VLPA Interdisciplinary exploration of the connections between visual anthropology (ethnography through photography and film), documentary and art photography, and colonial and post-colonial discourse in Latin America during the twentieth century. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322 and one additional 300-level course beyond 303. Offered: jointly with SISLA 486.

SPAN 487 Mexican Cinema (5) I&S/VLPA Steele Analysis of representative films about post-revolutionary Mexico by directors from both the Golden Age of Mexican Cinema (1940-1960) and the Mexican New Film movement (1975-the present). Revolutionary nationalism, modernization and its discontents; construction of gender, class and ethnicity; migration and globalization. Prerequisite: either SPAN 303 or SPAN 316; SPAN 322 and one additional 300-level course beyond SPAN 303.

SPAN 488 The Fantastic in Latin American Literature (5) VLPA O'Hara Introduction to the Fantastic in literature, in contrast to realism, and how the concept has been adapted by Latin American authors. May focus on a particular writer: Augusto Monterroso (Guatemala) or Julio Cortázar (Argentina), or survey various authors. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 489 The Mexico-U.S. Border in Literature and Film (5) I&S/VLPA Doremus, Steele Analysis of the Mexico-U.S. Border region in literature and film of the 1990s and early 2000s. Includes migration, tourism, NGOs, globalization, transnational commerce, multiculturalism, and politics of gender, sexuality and race. Prerequisite: either SPAN 303 or SPAN 316; either SPAN 321 or SPAN 322; one additional 300-level course above SPAN 303. Offered: jointly with SISLA 489.

SPAN 490 Honors Seminar (2-5, max. 10) VLPA Special studies in Spanish literature. Required of candidates for Honors and Distinction in Spanish.

SPAN 491 Individual Authors and Special Topics in Spanish Literature (5, max. 10) VLPA Focus on an individual Spanish author or a special problem in Spanish literature. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303.

SPAN 493 Foreign Study (2-10, max. 20) VLPA Advanced study in Spanish speaking country outside the standard Spanish curriculum of the University of Washington. Prerequisite: either SPAN 303 or SPAN 316; one additional 300-level course above SPAN 303.

SPAN 495 Study in Spain (2-10, max. 20) VLPA Advanced study in Spain in approved foreign study programs. Prerequisite: SPAN 303; one additional course above SPAN 303.

SPAN 499 Special Topics (1-5, max. 10) Topics to meet special needs.

SPAN 510 Methodology of Spanish Language Teaching (3) Borneguero Theoretical and practical foundation for teaching Spanish. Major topics include modern theories of language and language acquisition which underlie modern methods of foreign language teaching, teaching techniques, testing, classroom relations. Emphasis on the multiple-approach direct method. Required for beginning Spanish Teaching Assistants. Credit/no credit only.

SPAN 521 The Renaissance in Spain (5) Literary creation and the cultural, social, historical context of Spanish literature from La Celestina through the sixteenth century. Extensive study of secondary materials, intensive analysis of representative literary texts.

SPAN 522 The Renaissance in Spain (5) Literary creation and the cultural, social, historical context of Spanish literature from La Celestina through the sixteenth century. Extensive study of secondary materials, intensive analysis of representative literary texts.

SPAN 541 History of the Spanish Language (5) Summary of the evolution of Spanish language from the fragmentation of Peninsular Romance to Cantar de Mio Cid. The main work consists of analysis of early Castilian texts.

SPAN 542 History of the Spanish Language (5) Summary of the evolution of Spanish language from the fragmentation of Peninsular Romance to Cantar de Mio Cid. The main work consists of analysis of early Castilian texts.

SPAN 561 Spanish-American Novel From 1940 to the Present (5) .

SPAN 571 The Modern Essay in Spanish America (5) .

SPAN 572 Twentieth-Century Spanish Poetry (5, max. 10) .

SPAN 573 Twentieth-Century Spanish-American Poetry (5, max. 10) .

SPAN 575 Literary Criticism (5) .

SPAN 577 Contemporary Literary Theory (5) Introduction to various structuralist and poststructuralist theories of literary analysis, including those developed by Hispanic theorists, and their application to the study of texts from the Spanish and Latin American traditions.

SPAN 590 Special Seminar and Conference (1-10, max. 30) Group seminars, or individual conferences, are scheduled under this number to meet special needs. Prerequisite: permission of the graduate program coordinator.

SPAN 591 Literary Problems: Middle Ages (5, max. 10) .

SPAN 592 Literary Problems: Renaissance (5, max. 10) .

SPAN 593 Literary Problems: Golden Age (5, max. 10) .

SPAN 594 Literary Problems: Eighteenth Century (5, max. 10) .

SPAN 595 Literary Problems: Nineteenth Century (5, max. 10) .

SPAN 596 Literary Problems: Twentieth Century (5, max. 10) .

SPAN 597 Literary Problems: Spanish-American Colonial Literature (5, max. 10) .

SPAN 598 Literary Problems: Latin America (5, max. 10) .

SPAN 600 Independent Study or Research (*) .

SPAN 700 Master's Thesis (*) Credit/no credit only.

SPAN 800 Doctoral Dissertation (*) Credit/no credit only.

Scandinavian Studies

Danish

DANISH 101 Elementary Danish (5) Fundamentals of oral and written Danish.

DANISH 102 Elementary Danish (5) Fundamentals of oral and written Danish.

DANISH 103 Elementary Danish (5) Fundamentals of oral and written Danish.

DANISH 199 Foreign Study: Elementary Danish (1-15, max. 15) Fundamental of oral and written Danish.

DANISH 201 Second-Year Danish (5) VLPA Intensive practice in speaking, reading, and writing. Review of grammar. Introduction of modern literary texts. Discussion of culture and current events in Denmark. Recommended: DANISH 103.

DANISH 202 Second-Year Danish (5) VLPA Intensive practice in speaking, reading, and writing. Review of grammar. Introduction of modern literary texts. Discussion of culture and current events in Denmark. Recommended: DANISH 103.

DANISH 203 Second-Year Danish (5) VLPA Intensive practice in speaking, reading, and writing. Review of grammar. Introduction of modern literary texts. Discussion of culture and current events in Denmark. Recommended: DANISH 103.

DANISH 299 Foreign Study: Intermediate Danish (1-15, max. 15) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Discussion of culture and current events in Denmark.

DANISH 310 Topics in Danish Short Prose (5, max. 15) VLPA Focuses on the fairy tale and story, with selections by Bicher, H.C. Andersen, Bang, Blixen, and others.

DANISH 311 Topics in Danish Literature and Culture (5, max. 15) VLPA Selected topics in

modern Danish literature and culture, such as women's literature, Danish identity and the European Union, contemporary drama and film, or children's literature. Recommended: DANISH 203.

DANISH 312 Topics in the Danish Novel (5, max. 15) VLPA Focuses on selected novels from the 19th and 20th centuries by figures such as J.P. Jacobsen, Herman Bang, J.V. Jensen, Hans Kirk, Scherfig and Ditlevsen.

DANISH 395 Foreign Study: Danish Area Studies (1-5, max. 10) I&S Courses in Danish history, society, and/or politics.

DANISH 399 Foreign Study: Topics in Danish Literature and Culture (1-5, max. 15) VLPA Topics in Danish literature, life, and civilization.

DANISH 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Danish language, literature, or related fields.

Estonian

ESTO 101 Elementary Estonian (5) Fundamentals of oral and written Estonian.

ESTO 102 Elementary Estonian (5) Fundamentals of oral and written Estonian.

ESTO 103 Elementary Estonian (5) Fundamentals of oral and written Estonian.

ESTO 150 Intensive Estonian (15) Fundamentals of oral and written Estonian. Intensive practice in speaking, reading, and writing Estonian. Interactive classroom, computer-assisted learning, language, and reading laboratories. Emphasis on contemporary Estonian culture and society.

ESTO 201 Second-Year Estonian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: ESTO 103.

ESTO 202 Second-Year Estonian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: ESTO 103.

ESTO 203 Second-Year Estonian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: ESTO 103.

ESTO 250 Intensive Intermediate Estonian (15) VLPA Accelerated second-year Estonian. Systematic review of Estonian grammar. Intensive practice in conversation, reading, and writing. Recommended: ESTO 103 or ESTO 150. Offered: S.

ESTO 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Estonian language, culture, or society.

Finnish

FINN 101 Elementary Finnish (5) Fundamentals of oral and written Finnish.

FINN 102 Elementary Finnish (5) Fundamentals of oral and written Finnish.

FINN 103 Elementary Finnish (5) Fundamentals of oral and written Finnish.

FINN 150 Intensive First-Year Finnish (15) Fundamentals of oral and written Finnish. Intensive practice in speaking, reading, and writing. Interactive classroom, computer-assisted learning, and language and reading laboratories. Emphasis on contemporary Finnish culture and society.

FINN 199 Foreign Study: Elementary Finnish (1-15, max. 15) Fundamentals of oral and written Finnish.

FINN 201 Second-Year Finnish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: FINN 103.

FINN 202 Second-Year Finnish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: FINN 103.

FINN 203 Second-Year Finnish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: FINN 103.

FINN 299 Foreign Study: Intermediate Finnish (1-15, max. 15) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Discussion of culture and current events in Finland.

FINN 310 Topics in Finnish Language and Culture (5, max. 15) VLPA Topics related to Finnish literature, life, and civilization. Recommended: FINN 203.

FINN 395 Foreign Study: Finnish Area Studies (1-5, max. 10) I&S Courses in Finnish history, society, and/or politics.

FINN 399 Foreign Study: Topics in Finnish Literature and Culture (1-5, max. 15) VLPA Topics in Finnish literature, life, and civilization.

FINN 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Finnish language, culture, or society.

Latvian

LATV 101 Elementary Latvian (5) Fundamentals of oral and written Latvian.

LATV 102 Elementary Latvian (5) Fundamentals of oral and written Latvian.

LATV 103 Elementary Latvian (5) Fundamentals of oral and written Latvian.

LATV 150 Intensive Latvian (15) Fundamentals of oral and written Latvian. Intensive practice in speaking, reading, and writing Latvian. Interactive classroom, computer-assisted learning, language, and reading laboratories. Emphasis on contemporary Latvian culture and society.

LATV 201 Second-Year Latvian (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: LATV 103.

LATV 202 Second-Year Latvian (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: LATV 103.

LATV 203 Second-Year Latvian (5) VLPA Intensive practice in speaking, reading, and

writing. Functional review of grammar. Recommended: LATV 103.

LATV 250 Intensive Intermediate Estonian (15) VLPA Accelerated second-year Latvian. Systematic review of Latvian grammar. Intensive practice in conversation, reading, and writing. Recommended: LATV 103 or LATV 150. Offered: S.

LATV 310 Topics in Latvian Literature (5, max. 15) VLPA Topics in Latvian literature, life, and civilization. Recommended: LATV 203.

LATV 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Latvian language, culture, or society.

Lithuanian

LITH 101 Elementary Lithuanian (5) Fundamentals of oral and written Lithuanian.

LITH 102 Elementary Lithuanian (5) Fundamentals of oral and written Lithuanian.

LITH 103 Elementary Lithuanian (5) Fundamentals of oral and written Lithuanian.

LITH 150 Intensive Lithuanian (15) Fundamentals of oral and written Lithuanian. Intensive practice in speaking, reading, and writing Lithuanian. Interactive classroom, computer-assisted learning, language, and reading laboratories. Emphasis on contemporary Lithuanian culture and society.

LITH 201 Second-Year Lithuanian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: LITH 103.

LITH 202 Second-Year Lithuanian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: LITH 103.

LITH 203 Second-Year Lithuanian (5) VLPA Intensive practice in speaking, reading and writing. Functional review of grammar. Recommended: LITH 103.

LITH 250 Intensive Intermediate Lithuanian (15) VLPA Accelerated second-year Lithuanian. Systematic review of Lithuanian grammar. Intensive practice in conversation, reading, and writing. Recommended: LITH 103 or LITH 150. Offered: S.

LITH 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Lithuanian language, culture, or society.

Norwegian

NORW 101 Elementary Norwegian (5) Fundamentals of oral and written Norwegian.

NORW 102 Elementary Norwegian (5) Fundamentals of oral and written Norwegian.

NORW 103 Elementary Norwegian (5) Fundamentals of oral and written Norwegian.

NORW 150 Intensive First-Year Norwegian (15) Fundamentals of oral and written Norwegian. Intensive practice in speaking, reading, and writing. Interactive classroom, computer-assisted learning, language and reading laboratories. Emphasis on contemporary Norwegian culture and society.

NORW 199 Foreign Study: Elementary Norwegian (1-15, max. 15) Fundamentals of oral and written Norwegian.

NORW 201 Second-Year Norwegian (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: NORW 103.

NORW 202 Second-Year Norwegian (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: NORW 103.

NORW 203 Second-Year Norwegian (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: NORW 103.

NORW 299 Foreign Study: Intermediate Norwegian (1-15, max. 15) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Discussion of culture and current events in Norway.

NORW 310 The Norwegian Short Story (5) VLPA Generic study of the Norwegian short story. Recommended: NORW 203.

NORW 311 Drama After Ibsen (5) VLPA Recommended: NORW 203.

NORW 312 Topics in Norwegian Literature and Culture (5, max. 15) VLPA Topics related to Norwegian literature, life, and civilization. Recommended: NORW 203.

NORW 321 The Plays of Henrik Ibsen (5) VLPA Study of selected plays of Ibsen. Recommended: NORW 203.

NORW 395 Foreign Study: Norwegian Area Studies (1-5, max. 10) I&S Courses in Norwegian history, society, and/or politics.

NORW 399 Foreign Study: Topics in Norwegian Literature and Culture VLPA (1-5, max. 15) Topics in Norwegian literature, life, and civilization.

NORW 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Norwegian language, literature, or related fields.

Scandinavian

SCAND 100 Introduction to Scandinavian Culture (5) I&S/VLPA The Scandinavian experience from the Viking Age to the present day; the background for contemporary Scandinavian democracy, with major emphasis on the cultural, political, and religious development of the Scandinavian countries.

SCAND 150 Norwegian Literary and Cultural History (5) VLPA A survey of Norwegian literary and cultural history from the Vikings to the present. Authors read include Bjornson, Ibsen, Hamsun, and R  lvaag.

SCAND 151 Finnish Literary and Cultural History (5) VLPA A survey of Finnish literature and cultural history during the 19th and 20 centuries. Authors studied include Lonnot, Snellmann, Kivi, Sodergran, Linna, Haavikko, and Kaurismaki.

SCAND 152 Latvian Literary and Cultural History (5) VLPA *Grimberga* Survey of Latvian literary and cultural history from the nineteenth-century to the present. Authors include Pumpurs,

Rainis, Aspazija, Blaumanis, Nesaule, Bels, and Zalite.

SCAND 190 Crime Scenes: Investigating the Cinema and Its Cultures (5) VLPA *Ames, Nestingen* Teaches students how to analyze film by closely studying crime scenes from historical and contemporary German and Scandinavian cinema. Directors studied include Fritz Lang, Carl Th. Dreyer, Billy Wilder, and Lars von Trier. Offered jointly with GERMAN 190.

SCAND 200 Contemporary Scandinavian Society (5) I&S Examines the distinctive policies, institutions, and social norms of contemporary Scandinavian societies. Topics include: Nordic geography, the development of a "middle way" between capitalism and socialism, universal social policies, Scandinavia in the international system, and contemporary challenges to Scandinavian societies. Recommended: SCAND 100.

SCAND 230 Introduction to Folklore Studies (5) I&S/VLPA Comprehensive overview of the field of folkloristics, focusing on verbal genres, customs, belief, and material culture. Particular attention to the issues of community, identity, and ethnicity. Offered: jointly with C LIT 230.

SCAND 232 Hans Christian Andersen and the Fairy Tale Tradition (5) VLPA Influence of Hans Christian Andersen and the fairy tale on modern Scandinavian tales and stories. Investigates the significance of the fairy tale in modern world, with attentions to writers such as Isak Dinesen, Knut Hamsun, Villy Sorensen, William Heinesen.

SCAND 251 Holberg and His Comedies in English (2) VLPA Holberg and his major dramas, with attention to the comic tradition in the Scandinavian theatre.

SCAND 270 Sagas of the Vikings (5) VLPA Icelandic sagas and poetry about Vikings in the context of thirteenth-century society.

SCAND 280 Ibsen and His Major Plays in English (5) VLPA Reading and discussion of Ibsen's major plays.

SCAND 312 Masterpieces of Scandinavian Literature (5) VLPA Major works of Scandinavian literature by selected authors.

SCAND 325 Public Policy in Scandinavia (5) I&S Comparative and historical analysis of the evolution and change of domestic public policies in the Nordic welfare states; emphasis on health, education, social welfare, economic management, as well as the future of the welfare state.

SCAND 326 Scandinavia in World Affairs (5) I&S Introduction to the foreign relations of Scandinavia with a focus on Nordic security, international economic pressures, and global conflict resolution. Includes a survey of the national settings for international involvements and highlights the dilemmas for industrial societies exposed to the pressures of interdependence. Offered: jointly with POL S 326.

SCAND 327 Women in Scandinavian Society (5) I&S/VLPA Examines the changing position of women in Norway, Denmark, Finland, and Sweden from the 1880s to the contemporary period. Readings in literature and political science.

SCAND 330 Scandinavian Mythology (5) VLPA Integrative study of religious life in the pre-

Christian North. Emphasis on source materials, including the *Prose Edda* and *Poetic Edda*. Discussion of historical, archeological, and folkloric evidence.

SCAND 331 Folk Narrative (5) VLPA Survey of various genres of folk narratives studied in performance contexts to reveal their socio-cultural functions in a variety of milieux. Theory and history of folk narrative study, taxonomy, genre classification, and interpretative approaches. Recommended: SCAND 230 or C LIT 230. Offered: jointly with C LIT 331.

SCAND 334 Immigrant and Ethnic Folklore (5) I&S/VLPA Survey of verbal, customary, and material folk traditions in ethnic context. Theories of ethnic folklore research applied to the traditions of American communities of Scandinavian, Baltic, or other European ancestry. Recommended: SCAND 230 or C LIT 230. Offered: jointly with C LIT 334.

SCAND 335 Scandinavian Children's Literature (5) VLPA The history, forms, and themes of Scandinavian children's literature from H. C. Andersen to the present. Exploration of the dominant concerns of authors, adult and non-adult audiences, and the uses to which juvenile and adolescent literature are put. Film adaptations and Scandinavian-American materials included.

SCAND 340 Kalevala and the Epic Tradition (5) VLPA An interdisciplinary approach to the Finnish national epic *Kalevala*. Estonian *Kalevipoeg*, and Saami *Peivebarnen suongah jehtanasan maajisn*. Discussion of traditional worldview, cultural revitalization, and emergent nationalism in nineteenth- and twentieth-century Finland, Estonia, and Saamiland.

SCAND 341 Sami Culture and History (5) I&S/VLPA An interdisciplinary look at the culture of Sami (Lapp) people in Scandinavia from the earliest archeological and textual evidence to the present day. Focus on indigenous modes of expression and worldview, as well as contemporary cultural and political activism.

SCAND 344 The Baltic States and Scandinavia (5) I&S Survey of the cultures and history of Estonia, Latvia, and Lithuania from the Viking Age to the present, with particular attention to Baltic-Scandinavian contacts. Offered: jointly with EURO 344.

SCAND 345 Baltic Cultures (5) I&S/VLPA Cultures and peoples of Estonia, Latvia, and Lithuania. Baltic literature, music, art, and film in social and historical context. Traditional contacts with Scandinavia and Central and East Europe. Offered: jointly with EURO 345.

SCAND 350 Environmental Norms in International Politics (5) I&S Surveys development of international environmental consciousness from 1960s to present. Models of "green development"; ways in which norms for resource use have entered global politics. Patterns of state compliance with international environmental agreements, and why states fall short of meeting their international obligations. Offered: jointly with ENVIR 360/SIS 350.

SCAND 360 Scandinavian Cinema (3/5) VLPA Major Scandinavian films and film directors from the 1920s to the present.

SCAND 367 Sexuality in Scandinavia: Myth and Reality (5) I&S/VLPA Examines selected

Scandinavian literary and socio-political texts, films, and art to manifest the reality behind the myths of sexual freedom in Scandinavia.

SCAND 370 The Vikings (5) I&S/VLPA Vikings at home in Scandinavia and abroad, with particular emphasis on their activities as revealed in archaeological finds and in historical and literary sources. Offered: jointly with HSTAM 370.

SCAND 380 History of Scandinavia to 1720 (5) I&S Scandinavian history from the Viking Age to 1720, with an emphasis on the political, social, and economic development of Denmark, Norway, Sweden, Finland, and Iceland from the Middle Ages to the Enlightenment. Offered: jointly with HSTEU 380.

SCAND 381 History of Scandinavia Since 1720 (5) I&S Scandinavian history from the Enlightenment to the Welfare State with emphasis on the political, social, and economic development of the modern Scandinavian nations of Denmark, Norway, Sweden, Finland, and Iceland. Offered: jointly with HSTEU 381.

SCAND 399 Foreign Study in Scandinavia (1-5, max. 20) Pan-Scandinavian coursework in Scandinavia, including courses in English.

SCAND 402 International Political Economy and Scandinavia (5) I&S Overview of the most prominent theoretical approaches to the study of international political economy. Evaluates competing theories and applies these to explain contemporary problems in International Political Economy. Readings include examples from Scandinavia's experience.

SCAND 403 Scandinavian Immigration in History and Literature (5) VLPA/I&S History and literature of Scandinavian immigration to North America, including immigrant life and culture, community structures and traditions, and the literature about and by immigrants from Denmark, Finland, Iceland, Norway, and Sweden. Offered: jointly with HIST 403.

SCAND 427 Scandinavian Women Writers in English Translation (5) VLPA Selected works by major Scandinavian women writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with WOMEN 429.

SCAND 430 Readings in Folklore (5) VLPA Exploration of theoretical and methodological issues in folklore studies through independent reading of journal articles published during the last five years. Recommended: SCAND 230 or C LIT 230. Offered: jointly with C LIT 430.

SCAND 431 The Northern European Ballad (5) VLPA Integrative study of the Northern European Ballad, with an emphasis on texts, performance, context, history, theory, genre classification, and interpretive approaches. Offered: jointly with C LIT 431.

SCAND 437 Politics in Scandinavia (5) I&S Twentieth-century politics in Scandinavia. How Scandinavian countries have been governed. Costs and consequences of their governmental style and its uncertain future. Optimal size of polities, problems of mature welfare states, process of leadership and representation in multiparty systems, decline of political parties. Offered: jointly with POL S 437.

SCAND 445 War and Occupation in Northern Europe: History, Fiction, and Memoir (5) The

study of literary representations (fiction, memoirs, and personal narratives) dealing with World War II and the occupation of the Nordic and Baltic countries. Offered: jointly with EURO 445.

SCAND 450 Scandinavian Literary History (3) VLPA Survey of Scandinavian literary history. Recommended: DANISH 203, FINN 203, NORW 203, or SWED 203.

SCAND 454 Baltic History (5) I&S Overview of the history of the area occupied by the Baltic countries of Latvia, Lithuania, and Estonia. Emphasizes their emergence as modern European nation-states. Era from World War I to present treated in depth, including the historical role and present situation of non-Baltic peoples, particularly Russians. Offered: jointly with HSTEU 454.

SCAND 455 Baltic States Since 1991 (5) I&S Intensive interdisciplinary survey of social, political and economic developments in Estonia, Latvia, and Lithuania since 1991. Offered: jointly with SISRE 465.

SCAND 460 History of the Scandinavian Languages (5) VLPA Development of languages from common Scandinavian to contemporary Danish, Norwegian, Swedish, Faroese, and Icelandic. Recommended: DANISH 203, FINN 203, NORW 203, or SWED 203.

SCAND 462 Isak Dinesen and Karen Blixen (5) VLPA The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with WOMEN 462.

SCAND 480 Kierkegaard and Decadence in European Literature (5) VLPA Reading and discussion of core texts by Soren Kierkegaard, as well as a consideration of the relationship between Kierkegaardian thought and the literary practice of various writers of Scandinavian and European decadence.

SCAND 481 August Strindberg and European Cultural History (5) I&S/VLPA Examines the work of Swedish dramatist, novelist, and painter August Strindberg, in the context of European literary movements and history of ideas from 1880 to 1912, and Strindberg's influence on 20th-century drama and film. Offered: jointly with EURO 481.

SCAND 484 The Films of Ingmar Bergman (5) VLPA Major films of Ingmar Bergman.

SCAND 490 Special Topics (1-5, max. 15) Special topics in Scandinavian art, literature, culture, and history. Course offerings based on instructor's specialty and student demand.

SCAND 495 Foreign Study: Research Project (1-5, max. 10) Research on approved topic.

SCAND 498 Senior Essay (5) VLPA Undergraduate research and the writing of a senior essay in Scandinavian area studies.

SCAND 499 Independent Study or Research (1-5, max. 10) Independent study or research in Scandinavian area studies. May be done in a Scandinavian language or in English.

SCAND 500 Introductory Readings in Old Icelandic (5) Systematic study of the grammati-

cal structure of Old Icelandic and the reading of several short prose works.

SCAND 501 Old Icelandic Language and Literature (5) Reading of a major work in Old Icelandic literature as a vehicle for discussions about literary history and genre, narrative, and rhetorical strategies.

SCAND 503 Methods of Scandinavian Studies (5) Introduction to Scandinavian studies on the graduate level with emphasis on Scandinavian literature, folklore, history, and politics.

SCAND 504 Contemporary Literary Theory (5) Contemporary literary theory and its application to Scandinavian texts. Prerequisite: graduate student standing or permission of instructor.

SCAND 505 Topics in Scandinavian Drama and Film (5, max. 15) Seminar on a selected topic in Scandinavian drama or film, such as an author (Holberg, Ibsen, Strindberg, Bergman), a period, a genre, or a movement.

SCAND 508 Topics in Scandinavian Prose (5, max. 15) Seminar on various topics in Scandinavian prose, including shorter prose texts, as well as a selection of the significant novels of the nineteenth and twentieth centuries.

SCAND 513 Scandinavian Linguistics (3) Selected topics in Scandinavian linguistics.

SCAND 515 Pre-Nineteenth-Century Scandinavian Literature (5) Seminar on Scandinavian literature of the sixteenth, seventeenth, and eighteenth centuries.

SCAND 518 Foreign Language Teaching Methodology (2) Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518/SLAV 518.

SCAND 519 Modern Scandinavian Politics (5) Analyzes the political, economic, and historical development of Sweden, Norway, Denmark, Iceland, and Finland from World War II to the present. Readings focus on domestic and foreign policies that distinguish these countries from other advanced industrial societies. Offered: jointly with POL S 519.

SCAND 520 Topics in Scandinavian Poetry (5, max. 15) Seminar on selected periods of Scandinavian poetry: romanticism, symbolism, modernism, and contemporary poetry. Poetry examined in relation to the literary canon of each country and to Scandinavian literature as a whole. International influences also discussed.

SCAND 525 Topics in Scandinavian History (5, max. 15) Seminar on selected topics in Scandinavian history.

SCAND 530 Old Norse Literature (3) Studies in the poetry and prose tradition of medieval Iceland and Norway.

SCAND 533 Interdisciplinary Approaches to Community in Scandinavia (5) Humanistic examination of community creation, maintenance, and change in the Nordic region. Examples drawn from folklore, literature, activism, popular culture, history. Focus on issues of gender, belief, and art in relation to

community. Coursework includes both individual and collaborative assignments.

SCAND 590 Special Topics in Scandinavian Literature (1-5, max. 15) .

SCAND 594 Modern Methods and Materials in Teaching Scandinavian and Baltic Languages (3) Theory and practice of communicative language teaching; current developments in foreign-language teaching; evaluation of teaching materials; includes attendance at the departmental and university-wide fall orientation; required for beginning teaching assistants of Scandinavian and the Baltic languages. May not be taken for credit if GRDSCH 615 already taken. Prerequisite: SCAND 518. Credit/no credit only.

SCAND 600 Independent Study or Research (*) Prerequisite: permission of instructor.

SCAND 700 Master's Thesis (*) .

SCAND 800 Doctoral Dissertation (*) .

Swedish

SWED 101 Elementary Swedish (5) Fundamentals of oral and written Swedish.

SWED 102 Elementary Swedish (5) Fundamentals of oral and written Swedish.

SWED 103 Elementary Swedish (5) Fundamentals of oral and written Swedish.

SWED 150 Intensive First-year Swedish (15) Fundamentals of oral and written Swedish. Intensive practice in speaking, reading, and writing. Interactive classroom, computer-assisted learning, language and reading laboratories. Emphasis on contemporary Swedish culture and society.

SWED 199 Foreign Study: Elementary Swedish (1-15, max. 15) Fundamentals of oral and written Swedish.

SWED 201 Second-year Swedish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: SWED 103.

SWED 202 Second-year Swedish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: SWED 103.

SWED 203 Second-year Swedish (5) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Recommended: SWED 103.

SWED 299 Foreign Study: Intermediate Swedish (1-15, max. 15) VLPA Intensive practice in speaking, reading, and writing. Functional review of grammar. Discussion of culture and current events in Sweden.

SWED 300 Swedish Women Writers (5) VLPA Readings from works by Swedish women writers. Recommended: SWED 203.

SWED 301 Topics in Swedish Literature and Culture (5, max. 15) VLPA Topics in Swedish literature, life, and civilization. Recommended: SWED 203.

SWED 302 The Swedish Novel (5) VLPA Selected works by novelists of the nineteenth and twentieth centuries. Recommended: SWED 203.

SWED 352 Strindberg and His Works (5) VLPA Representative short stories, dramas, autobiographical works, poems, and one novel. Recommended: SWED 203.

SWED 395 Foreign Study: Swedish Area Studies (1-5, max. 10) I&S Courses in Swedish history, society, and/or politics.

SWED 399 Foreign Study: Topics in Swedish Literature and Culture (1-5, max. 15) VLPA Topics in Swedish literature, life, and civilization.

SWED 490 Supervised Reading (1-5, max. 10) Readings in a selected area of Swedish language, literature, or related fields.

Slavic Languages and Literatures

Bosnian, Croatian, Serbian

BCS 401 Elementary Bosnian/Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Bosnian, Croatian, and Serbian. Offered: A.

BCS 402 Elementary Bosnian/Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Bosnian, Croatian, and Serbian. Prerequisite: BCS 401, which may be taken concurrently. Offered: W.

BCS 403 Elementary Bosnian/Croatian/Serbian (5) Comprehensive introduction to spoken and written literary Bosnian, Croatian, and Serbian. Prerequisite: BCS 402, which may be taken concurrently. Offered: Sp.

BCS 410 Intensive Third Year Bosnian-Croatian-Serbian (10) VLPA *Belic* Advanced grammatical exercises and listening, reading, and writing skills development. Emphasis on strengthening of conversational and presentational competence. Prerequisite: BCS 406. Offered: A.

BCS 420 Literature, Film, and Culture of the Former Yugoslavia and the Yugoslav Successor States (5) VLPA A travelogue through the intellectual and cultural landscape of the former Yugoslavia and the Yugoslav successor states, studying the select literary works, films, and other artifacts, with the exploration of both how these phenomena are a part of their intellectual and historical environment, and how they transcend and change it.

Bulgarian

BULGR 401 Elementary Bulgarian (5) Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Offered: A.

BULGR 402 Elementary Bulgarian (5) Introduction to Bulgarian phonology and grammar in terms of the modern spoken language. Writing conventions of literary Bulgarian. Prerequisite: BULGR 401. Offered: W.

BULGR 403 Elementary Bulgarian (5) Reading of modern texts to increase command of grammar and vocabulary. Prerequisite: BULGR 402. Offered: Sp.

BULGR 404 Advanced Bulgarian (5) VLPA Continuation of 401, 402, 403. Selected readings

in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: 2.0 in BULGR 403. Offered: A.

BULGR 405 Advanced Bulgarian (5) VLPA Continuation of 401, 402, 403. Selected readings in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: BULGR 404. Offered: W.

BULGR 406 Advanced Bulgarian (5) VLPA Continuation of 401, 402, 403. Selected readings in Bulgarian literature, history, and culture. Reinforces and extends basic knowledge of Bulgarian grammar and vocabulary. Prerequisite: BULGR 405. Offered: Sp.

Czech

CZECH 401 Elementary Czech (5) Introduction to spoken and written Czech. Offered: A.

CZECH 402 Elementary Czech (5) Introduction to spoken and written Czech. Prerequisite: CZECH 401. Offered: W.

CZECH 403 Elementary Czech (5) Modern Czech prose, leading to a command of the language as a research tool and providing an adequate basis for further study. Prerequisite: CZECH 402. Offered: Sp.

Polish

POLSH 401 Elementary Polish (5) Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Offered: A.

POLSH 402 Elementary Polish (5) Principal morphological and syntactic features of the Polish language through the medium of a basic vocabulary. Prerequisite: POLSH 401. Offered: W.

POLSH 403 Elementary Polish (5) Designed to enlarge general vocabulary by the reading of short texts selected from Polish authors of the nineteenth and twentieth centuries. Prerequisite: POLSH 402. Offered: Sp.

Romanian

ROMN 401 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Offered: jointly with RMN 401; A.

ROMN 402 Elementary Romanian (5) Comprehensive introduction to spoken and literary Romanian. Prerequisite: ROMN/RMN 401. Offered: jointly with RMN 402; W.

ROMN 403 Elementary Romanian (5) Designed to increase vocabulary and enhance knowledge of grammar through readings in modern Romanian. Prerequisite: ROMN/RMN 402. Offered: jointly with RMN 403; Sp.

ROMN 404 Advanced Romanian (5) VLPA Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: 2.0 in ROMN/RMN 403. Offered: jointly with RMN 404; A.

ROMN 405 Advanced Romanian (5) VLPA Continuation of 401, 402, 403. Introduction to

Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: ROMN/RMN 404. Offered: jointly with RMN 405; W.

ROMN 406 Advanced Romanian (5) VLPA
Continuation of 401, 402, 403. Introduction to Romanian literature, history, and culture through selected readings. Reinforces and extends basic knowledge of grammar and vocabulary. Prerequisite: ROMN/RMN 405. Offered: jointly with RMN 406; Sp.

Russian

RUSS 101 First-Year Russian (5) Introduction to Russian. Emphasis on oral communication with limited vocabulary. Short readings and writing exercises. Basic grammar. Conducted mostly in Russian. See credit note above. Offered: A.

RUSS 102 First-Year Russian (5) Introduction to Russian. Emphasis on oral communication with limited vocabulary. Short readings and writing exercises. Basic grammar. Conducted mostly in Russian. See credit note above. Prerequisite: RUSS 101. Offered: W.

RUSS 103 First-Year Russian (5) Introduction to Russian. Emphasis on oral communication with limited vocabulary. Short readings and writing exercises. Basic grammar. Conducted mostly in Russian. See credit note above. Prerequisite: RUSS 102. Offered: Sp.

RUSS 110 Introduction to Russian Culture and Civilization (5) I&S/VLPA Introduction to Russian culture and history from pre-Christian times to the present, as seen through literary texts, music, film, visual art, and historical works. All lectures and written materials in English. No prior knowledge of Russian necessary.

RUSS 120 Topics in Russian Literary and Cultural History (5) VLPA Introduction to important issues in Russian literary and cultural history. Topics and instructors vary. Offered in English.

RUSS 150 Intensive First-Year Russian (15) Covers material of 101, 102, 103 in one quarter. Meets three to four hours daily. For continuation, see 250 or 201, 202, 203. See credit note above. Offered: S.

RUSS 201 Second-Year Russian (5) VLPA Comprehensive review of Russian grammar with continuing oral practice and elementary composition. Conducted mostly in Russian. See credit note above. Prerequisite: either 2.0 in RUSS 103 or 2.0 in RUSS 150. Offered: A.

RUSS 202 Second-Year Russian (5) VLPA Comprehensive review of Russian grammar with continuing oral practice and elementary composition. Conducted mostly in Russian. See credit note above. Prerequisite: RUSS 201. Offered: W.

RUSS 203 Second-Year Russian (5) VLPA Comprehensive review of Russian grammar with continuing oral practice and elementary composition. Conducted mostly in Russian. See credit note above. Prerequisite: RUSS 202. Offered: Sp.

RUSS 230 Masterpieces of Russian Literature (5) VLPA Examines the greatest authors and masterpieces of Russian literature, including

Tolstoy, Dostoevsky, and Chekhov. All readings, discussions, and assignments are in English.

RUSS 250 Intensive Second-Year Russian (15) VLPA Covers material of 201, 202, 203 in one quarter. Meets three to four hours daily. See credit note above. Prerequisite: either 2.0 in RUSS 103 or 2.0 in RUSS 150. Offered: S.

RUSS 301 Intermediate Russian (5) VLPA Extensive practice in spoken and written Russian based on a variety of prose readings. Intensive review and supplementation of strategic grammatical concepts. See credit note above. Prerequisite: either 2.0 in RUSS 203 or 2.0 in RUSS 250. Offered: A.

RUSS 302 Intermediate Russian (5) VLPA Extensive practice in spoken and written Russian based on a variety of prose readings. Intensive review and supplementation of strategic grammatical concepts. See credit note above. Prerequisite: RUSS 301. Offered: W.

RUSS 303 Intermediate Russian (5) VLPA Extensive practice in spoken and written Russian based on a variety of prose readings. Intensive review and supplementation of strategic grammatical concepts. See credit note above. Prerequisite: RUSS 302. Offered: Sp.

RUSS 304 Reading and Translation (1, max. 3) VLPA Translation techniques with emphasis on development of vocabulary and reading skills. Primarily for Russian regional studies majors. Credit/no credit only. Prerequisite: either RUSS 203 or RUSS 250. Offered: AWSp.

RUSS 313 Business Russian (5) VLPA Emphasizes the language and practice of business in Russia today. Prerequisite: either RUSS 203 or RUSS 250.

RUSS 321 Russian Literature and Culture 1700 - 1840 (5) I&S/VLPA Introduction to literary works, art, and architecture in relation to the development of Russian thought, both secular and religious. Attention given to the influences of Western Europe and what is distinctly Russian, and to the formation of national self-awareness. Offered: A.

RUSS 322 Russian Literature and Culture 1700-1900 (5) I&S/VLPA Literature as an element in Russian culture. Art, architecture, music, and philosophy also treated. Periods covered include the age of Peter the Great, romanticism, realism, and impressionism. Offered: W.

RUSS 323 Russian Literature and Culture of the Twentieth Century (5) I&S/VLPA Literature as an element in modern Russian culture. Art, architecture, and music also treated. Periods covered include symbolism, revolution, postrevolution, Stalinist, the "thaw," and contemporary. Offered: Sp.

RUSS 324 Russian Folk Literature in English (5) I&S/VLPA Russian popular tradition, including paganism and its survival into modern times. Genres of the oral tradition, including the folktale, the epic, spiritual and historical songs, and legends. Special attention to modern theories and western European analogues.

RUSS 350 Intensive Third-Year Russian (15) VLPA Covers material of 301, 302, 303 in one quarter. Meets three hours daily. See credit note above. Prerequisite: either 2.0 in RUSS 203 or 2.0 in RUSS 250. Offered: S.

RUSS 351 Intermediate Russian Phonetics (3) VLPA Systematic study of the Russian sound system, including phonetic transcription and intonational patterns. Instruction in correcting individual pronunciation errors. Conducted partly in Russian. Prerequisite: either RUSS 203 or RUSS 250.

RUSS 352 Intermediate Russian Morphology (3) VLPA Examination of Russian morphology with emphasis on topics that help to prepare the student for advanced courses in Russian. Conducted partly in Russian. Prerequisite: either RUSS 203 or RUSS 250.

RUSS 401 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: either 2.0 in RUSS 303 or 2.0 in RUSS 350. Offered: AWSp.

RUSS 402 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 401. Offered: AWSp.

RUSS 403 Advanced Russian (5) VLPA Class discussion, oral presentations, and composition, based on reading a variety of texts, both literary and non-literary. Advanced grammar. Translation one full course period per week. See credit note above. Prerequisite: RUSS 402. Offered: AWSp.

RUSS 420 Topics in Russian Literary and Cultural History (5, max. 20) VLPA A special topic in the literary and cultural history of Russia. Topics vary.

RUSS 421 Post-Soviet Literary and Cultural Scene (5, max. 15) VLPA Russian literature of the second half of the twentieth century. In English.

RUSS 422 Russian Literature in Emigration and Exile (5) VLPA Examines writers who left the Soviet Union during the post-Stalin period up to the fall of communism or who, though they resided in the USSR, published through unofficial channels. Discussion of Aksyonov, Siniavsky, Voinovich, Zinoviev, and others.

RUSS 423 Russian Film (5, max. 15) VLPA Early Russian, Soviet, and post-Soviet film. Featured filmmakers include Sergei Eisenstein, Dziga Vertov, Vsevolod Pudovkin, and others. Focuses on critical materials pertaining to filmmaking and film theory.

RUSS 424 Topics in Ethnicity and Cultural Identity (5, max. 15) I&S/VLPA Issues of cultural and ethnic identities and neo-colonialism. Special focus on Russian and East European Jewish literature and culture, and central Asian literature, art, and culture. Taught in English.

RUSS 425 Russian Drama (5, max. 15) VLPA Analysis of history and development of Russian drama from the 18th century to present times. Playwrights featured include Alexander Griboedev, Alexander Ostrovsky, Anton Chekhov, Vladimir Mayakovsky, and others. Taught in English.

RUSS 426 Russian Art and Architecture (5) VLPA West Survey of Russian art and architecture from the middle ages to the twentieth century, covering the place of the visual

arts in Russian culture, the relationship between visual and verbal art, and the appropriate reading of works of Russian art of all periods.

RUSS 430 Major Authors (5, max. 15) VLPA Major Russian writers of the nineteenth and twentieth centuries. Among authors read are Pushkin, Gogol, Lermontov, Turgenev, Tolstoy, Dostoevsky, Chekhov, Babel, Ilf and Petrov, Olesha. Content varies.

RUSS 450 Intensive Fourth-Year Russian (15) VLPA Covers material of 401, 402, 403 in one quarter. Meets three hours daily. See credit note above. Prerequisite: either 2.0 in RUSS 303 or 2.0 in RUSS 350. Offered: S.

RUSS 451 Structure of Russian (5) VLPA Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: either RUSS 303 or RUSS 350. Offered: A.

RUSS 452 Structure of Russian (5) VLPA Descriptive analysis of contemporary standard Russian. Detailed phonetic transcription, discussion of major Great Russian dialects as well as variations in popular speech, examination of common roots and productive derivational elements in Russian words, and elementary principles of syntax. Prerequisite: RUSS 451. Offered: W.

RUSS 461 Introduction to Russian Literature in Russian (5) VLPA Analysis of original Russian literary texts representative of different varieties of Russian writing. Vocabulary of Russian literary analysis; typically Russian approaches to literature, some readings of secondary critical texts; discussion in Russian of passages studied. Prerequisite: RUSS 403 or RUSS 450.

RUSS 481 Russian Language in Russia (5, max. 15) VLPA Daily work in phonetics, grammar, conversation, translation, analytical reading, stylistics, newspaper analysis, and advanced syntax. Prerequisite: either RUSS 203 or RUSS 250. Offered: AWSpS.

RUSS 482 Research Project in Russia (3, max. 15) VLPA Supervised research in student's selected area of concentration, combined with language instruction tailored to the student's field. Successful completion of course requires a 15-page term paper in Russian. Prerequisite: either RUSS 203 or RUSS 550. Offered: AWSpS.

RUSS 483 Russian Literature in Russia (3, max. 15) VLPA Selection of courses on specialized topics in Russian literature; specific authors or periods. Prerequisite: either RUSS 203 or RUSS 250. Offered: AWSpS.

RUSS 486 Culture in Russia (3, max. 15) I&S/ VLPA Lectures on education, history, economics, law, the arts, ethnography, architecture; complemented by visits to places of cultural and historical interest and meetings with Russian groups. 4 credits for summer program, 6 for semester program. Prerequisite: either RUSS 203 or RUSS 250. Offered: AWSpS.

RUSS 490 Studies in Russian Literature (3-5, max. 15) VLPA In either Russian or English. Topics vary.

RUSS 499 Directed Study or Research (1-5,

max. 15) Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Offered: AWSpS.

RUSS 501 Russian Language for Graduate Students (2, max. 10) Develops skills of particular use to graduate students. Emphasis on rapid assimilation of variety of written materials with sophisticated understanding and maximum retention of vocabulary, and ability to discuss in Russian the more theoretical and abstract kinds of material. Prerequisite: RUSS 403 or equivalent and graduate standing in Russian, East European, and Central Asian Studies.

RUSS 502 Russian Translation (3) Introduction to the theory of translation; translation to and from Russian of selected prose passages in a variety of styles, with emphasis on idiomatic accuracy and stylistic compatibility. Prerequisite: two quarters of RUSS 501 or permission of instructor.

RUSS 512 Russian Literary Criticism (3) A study of critical positions, problems, and literary values of major Russian literary critics from Belinsky to the present.

RUSS 520 Topics in Russian Literature and Culture (5, max. 20) Detailed study of a single author or a movement, theme, or short period in Russian literature or culture.

RUSS 521 Russian Literature to 1800 (5) Representative works of East Slavic, Muscovite, and Russian literature from the beginnings to 1800. Studies include a varied selection of primary texts. Intended as an introduction to the study of modern literature for beginning graduate students in Russian literature. Offered: alternate years.

RUSS 522 Russian Literature of the Nineteenth Century (5) Survey of nineteenth-century Russian poetry and prose. Representative works of Russia's major and minor authors, literary trends, and genres. Offered: alternate years.

RUSS 523 Russian Literature of the Twentieth Century (5) Survey of twentieth-century Russian poetry and prose. Pre-revolutionary, Soviet, and Émigré authors, trends, and genres. Includes survey of twentieth-century Literary Criticism as well, in particular Russian Formalists and Mikhail Bakhtin. Offered: alternate years.

RUSS 526 Modern Russian Literary, Cultural, and Film Studies (5, max. 15) Modern literature and film. Topics include post-colonialism, gender, reflections of social upheavals, artistic experimentation, issues of commercialism in art, search for new cultural expressions and identity. Readings in both Russian and English. Offered: Sp.

RUSS 542 Seminar in Russian Poetry (5, max. 20) One specific problem or theme in Russian poetry, seen in its widest possible dimensions. Students read, in Russian, the literary works involved and become familiar with the social, historical, and philosophical backgrounds that inspire them.

RUSS 543 Seminar in Contemporary Russian Prose (5, max. 20) Analysis of Russian prose fiction. Selected authors and topics.

RUSS 554 History of the Russian Literary Language (5) Russian literary language from the

eleventh through the twentieth centuries, with special attention to syntax and lexicon and to the development of notions of literary styles. Offered in Russian. Prerequisite: RUSS 555 or SLAV 565, or permission of instructor. Offered: alternate years.

RUSS 570 Research Seminar in Russian Literature (5) *Diment, Haney, Kramer, West* Working in consultation with a faculty adviser, students formulate a topic and prepare a 30-minute oral presentation to be delivered at the seminar and submit a written paper to be read and critiqued. by all participants.

RUSS 577 Russian Folk Literature (5) Analysis of representative works of the various genres of folk literature, including the byliny, skazki, historical and lyrical songs, and the spiritual stikhi.

RUSS 600 Independent Study or Research (*) .

Slavic

SLAV 223 Russian and East European Cinema (5) VLPA Introduction to Russian and Eastern European film from the origins to present day. Highlights achievements of Russian and Eastern European filmmakers, both in their countries of origin and abroad.

SLAV 351 History of the Slavic Languages (5) VLPA External and internal history of Slavic literary languages from the beginnings to the present time, including the development of writing systems, external attempts at reform, and the development of vocabulary.

SLAV 420 The Other Europe: Contemporary East European Fiction (5, max. 15) VLPA *Crnkovic* Contemporary fiction by Czech, East German, Hungarian, Polish, Baltic, and Balkan writers. Topics include: history of colonization, the imagination of social utopia, socialism and nationalism, everyday life under communism, cultural identity between East and West, experimental writing, new fiction in post-communist Eastern Europe. All readings in English.

SLAV 423 East European Film (5) VLPA *Crnkovic* Survey of major East European film makers. Compares East European and Western production of those directors who worked partially in the West, e.g., Polanski, Forman, Holland, Makavejev. Topics include film in socialist versus market economy, politics, gender, sexuality.

SLAV 425 Ways of Meaning: Universal and Culture Specific Aspects of Language (5) I&S/ VLPA *Dziwirek* Social and cultural conditioning of language use. Language as a mirror of culture and national character. Universal and culture/ language specific components in linguistic expression of emotions, courtesy/politeness and rudeness, prejudice and (in)sensitivities, linguistic expression of gender differences in different cultures. Offered: Sp.

SLAV 426 Ways of Feeling: Expressions of Emotions Across Languages and Cultures (5) I&S/ VLPA *Dziwirek* Universal and culture specific aspects of linguistic expression of emotion. Are there feelings that all people share independent of language, culture, gender, and race? Examination of the meaning and form of emotion words in different languages, facial expressions, cultural attitudes to emotion and emotional behavior, and gender-specific emotional expressions.

SLAV 470 Special Topics in Slavic Linguistics (3-5, max. 15) VLPA *Augerot, Coats, Dziwirek* Special topics in Slavic linguistics. Course offerings based on instructor's specialty and student demand. Offered: AWSp.

SLAV 481 East European Language in Eastern Europe (5, max. 15) VLPA Daily work in phonetic, grammar, conversation, translation, analytical reading, stylistics, newspaper analysis, and advanced syntax. Provides an opportunity to earn credits while studying in Eastern Europe. Offered: AWSpS.

SLAV 482 Research Project in Eastern Europe (3, max. 15) VLPA Supervised research in student's selected area of concentration, combined with language instruction tailored to the student's field. Provides an opportunity to earn credits while studying in Eastern Europe. Offered: AWSpS.

SLAV 483 East European Literature in Eastern Europe (3, max. 15) VLPA Selection of courses on specialized topics in East European literature; specific authors or periods. Provides an opportunity to earn credits while studying in Eastern Europe. Offered: AWSpS.

SLAV 486 East European Culture in Eastern Europe (3, max. 15) VLPA Lectures on various aspects of Eastern European culture, complemented by visits to places of cultural historical interest. Provides an opportunity to earn credits while studying in Eastern Europe. Offered: AWSpS.

SLAV 490 Studies in Slavic Literatures (3-5, max. 15) VLPA Topics vary.

SLAV 499 Directed Study or Research (1-5, max. 15) Individual study of topics to meet specific needs. By arrangement with the instructor and the Department of Slavic Languages and Literatures office. Prerequisite: permission of instructor and undergraduate adviser. Offered: AWSpS.

SLAV 501 Using Slavic Resources (2) Introduction to graduate studies in Slavic languages, literatures, and cultures. Discusses field of study and research materials and techniques employed.

SLAV 518 Foreign Language Teaching Methodology (2) *Brandl* Current foreign language teaching methods and approaches. Learning and teaching strategies and techniques for the four skills (reading, writing, speaking, listening) including cultural notions. Current and future trends in pedagogy and technology. Offered: jointly with ASIAN 518/GERMAN 518/NEAR E 518/SCAND 518.

SLAV 519 Slavic Language Pedagogy (3, max. 6) *Boyle* Introduction to current issues of foreign language pedagogy. Concentrates on the practical classroom application of methodological theory through lectures and micro-teaching presentation. Topics discussed and practiced include testing, proficiency teaching, teaching listening and reading skills, writing, teaching grammar, and computers. Offered: A.

SLAV 520 New Trends in Literary Theory (5) *Crnkovic* Explores recent theoretical trends which no longer search for a unified theoretical meta-narrative (i.e., post-structuralism or new historicism), but instead explore various literary genres (such as diary or fictional book reviews) and texts as the primary terrain of theory.

Bakhtin, Lem, Bruns, Corradi-Fiumara, Crnkovic, and others.

SLAV 550 Synchronic Slavic Linguistics (5) Linguistic analysis of the phonology, morphology, and syntax of Russian and other Slavic languages. Investigation of current theoretical work in these areas.

SLAV 551 The Introduction to the Study of Slavic Languages (5) External and internal history of Slavic literary languages from the beginnings to the present time, including the development of writing systems, external attempts at reform, and the development of vocabulary.

SLAV 560 Diachronic Slavic Linguistics (5) Development of the phonological and morphological system of Common Slavic from Indo-European. Evolution of Russian and other modern Slavic languages from Common Slavic. Offered: A.

SLAV 561 History of the East Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the Ukrainian and Byelorussian literary languages. Prerequisite: SLAV 560. Offered: alternate years.

SLAV 562 History of the West Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of literary Polish, Czech, Slovak, and Upper and Lower Sorbian languages. Prerequisite: SLAV 560. Offered: alternate years.

SLAV 563 History of the South Slavic Languages (5) Designed to acquaint majors in Slavic linguistics with the details of the historical development of the phonological and morphological structure of the South Slavic languages. Prerequisite: SLAV 560.

SLAV 565 Old Church Slavic (4) Rise and development of earliest Slavic literary language and a descriptive study of its orthography, phonology, morphology, and syntax. Readings from normalized texts. Offered: alternate years.

SLAV 566 Readings in Old Church Slavic (4) Reading and grammatical interpretation of a selected group of canonical texts, as well as some examples of the various later recensions of Old Church Slavonic. Prerequisite: SLAV 565. Offered: alternate years.

SLAV 570 Special Topics in Slavic Linguistics (3-5, max. 15) Investigation and discussion of special topics in Slavic linguistics.

Slavic Languages and Literatures

SLAVIC 175 The Slavic Text and Its Context (2) VLPA A contextual study of a significant work or intellectual movement from a Slavic culture study includes literature, film, music, or art. Credit/no credit only.

SLAVIC 498 Senior Honors Thesis ([3-9, max. 9]-) VLPA Directed research on a topic approved by department for a thesis presented in partial fulfillment of requirement for degrees "with honors" or "with distinction." Offered: AWSpS.

SLAVIC 600 Independent Study or Research (*) .

SLAVIC 800 Doctoral Dissertation (*) .

Ukrainian

UKR 401 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian.

UKR 402 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian. Prerequisite: UKR 401, which may be taken concurrently.

UKR 403 Elementary Ukrainian (5) Introduction to spoken and written Ukrainian. Prerequisite: UKR 402, which may be taken concurrently.

Sociology

SOC 110 Survey of Sociology (5) I&S Human interaction, social institutions, social stratification, socialization, deviance, social control, social and cultural change. Course content may vary, depending upon instructor. Offered: AWSpS.

SOC 111 American Society (5) I&S Explores the power of social structures using examples drawn primarily from the American culture. The impact of social institutions, the emergence of concrete patterns of social relations which organize and regulate social life and the inequality inherent in most social structures.

SOC 177 The Jewish Community in the United States: Success, Influence, and Prospects (5) I&S *Burstein* Examines relationship between American society and its ethnic/religious groups through study of the American Jewish community. Focuses on economic success; challenges to religious traditions; relationships between American and Jewish cultures; and impact of Jewish ideas and organizations on American politics. Offered: jointly with SISJE 177; S.

SOC 212 Evolution and Revolution: An Introduction to the Study of Comparative Social Change (5) I&S *Chirot, Hirschman* Examines the major aspects of human societies, including political and economic systems, family structure, social stratification, and demographic patterns as influenced by environmental conditions, technology, cultural traditions, and legacies of prior history and relationships to other societies. Not open for credit to students who have taken SOC 112.

SOC 195 Study Abroad: Sociology (2-5, max. 10) I&S Lower-division sociology courses for which there are no direct University of Washington equivalents, taken through a University of Washington study abroad program.

SOC 220 Introduction to Sociological Methods (5) I&S, QSR Familiarizes students with the logic of analysis in social sciences. Students learn to recognize good research design, understand and interpret main arguments employing different methods, and evaluate whether research findings support stated conclusions.

SOC 222 Sociology of Sport (5) I&S *Weis* Introduction to the sociological analysis of sport. Issues discussed include the history, definition, and functions of sport; role of sport in the socialization of children; the relationship between sport and values; athletics within the social organization of education; deviance, crime, and violence in sport; the business and economics of sport.

SOC 240 Introduction to Social Psychology: Perspectives on Individual Behavior (5) I&S
Major theoretical perspectives on individual behavior in social settings. Social cognition, behaviorism, symbolic interaction, and attitudes. Ways people develop as social beings. Traditional lecture format is not used in this course. Student learning is based on individualized programs of reading and frequent tests of student comprehension. Offered: AWSp.

SOC 241 Introduction to Social Psychology: Perspectives on Social Interaction (5) I&S
Major perspectives on social interaction. Social exchange, cooperation and competition, group dynamics, social influence, leadership, altruism and aggression. Situational and personal variables that determine social interaction. Traditional lecture format is not used in this course. Student learning is based on individualized programs of reading and frequent tests of student comprehension. Offered: AWSp.

SOC 246 Sects and Violence: Cults, Religious Innovation, and Social Conflict (5) I&S
Examines controversial religious groups often called cults. Use sociological lenses to examine cults' occasionally catastrophic conflicts with government authorities, established religious organizations, and anti-cult movements.

SOC 247 Contemporary Social Movements (5) I&S *Minkoff* Introduction to theory and research on national-level collective mobilizations organized for political change. Emphasis on how political, organizational, and cultural factors shape social movement emergence and development, and individual participation.

SOC 260 African American Family (5) I&S
Scott Explores the structures and functioning of various types of black families. Single-parent families, two-parent families, extended families, and consensual families are explored. Their consequences for male/female relationships are linked and critiqued. Offered: jointly with AFRAM 260.

SOC 261 The African-American Experience Through Literature (5) I&S/VLPA *Scott* Instructs students in hermeneutical and sociological methods of analyses. Analyzes selected novels, essays, poems, short stories, and plays with the purpose of understanding the structures and functions of both society and personality. Offered: jointly with AFRAM 261.

SOC 265 Globalization and the Transformation Economy and Society in Asia (5) I&S
Hamilton Examines the rapid and extensive social and economic development throughout Asia since the mid-20th century; the corresponding retail revolution in the American economy; the evolution of characteristic Asian product categories; and the impact of these developments on the social and economic organization of Asian economies. Offered: jointly with SISA 265.

SOC 266 Introduction to Labor Studies (5) I&S
Conceptual and theoretical issues in the study of labor and work. Role of labor in national and international politics. Formation of labor movements. Historical and contemporary role of labor in the modern world. Offered: jointly with HIST 249/POL S 249.

SOC 270 Social Problems (5) I&S *Black*
Processes of social and personal disorganization and reorganization in relation to poverty, crime, suicide, family disorganization, mental disorders, and similar social problems.

SOC 271 Introduction to the Sociology of Deviance and Social Control (5) I&S
Crutchfield Examination of deviance, deviant behavior, and social control. Deviance as a social process; types of deviant behavior (e.g., suicide, mental illness, drug use, crime, "sexual deviance," delinquency); theories of deviance and deviant behavior; nature and social organization of societal reactions; and social and legal policy issues. Offered: AWSpS.

SOC 275 Murder (5) I&S *Weis* Introduces topics related to the crime of murder, including: laws of homicide; research on the characteristics of victims, killers, and murders; theories of murder and related violence; investigation strategies; and crime and control policies.

SOC 287 Introduction to the Sociology of Sexuality (5) I&S Investigates sexuality on the basis of social construction of norms and values, within the context of gender, race, class, and sub-cultures and in the social control of sexuality and why it is so highly regulated. Looks for social, rather than biological or personal explanations for why human sexuality is conceptualize or practiced in a certain way.

SOC 292 Who Gets Ahead? Public Schooling in America (5) I&S *LePore* Addresses fundamental questions about the relationship between education and society. Examines why some students learn more and advance further than others; what factors shape how schools are run/organized and which materials are taught; how race/class/gender affect students within schools; how schools maintain our economic system and can become more effective.

SOC 299 Sociology Interest Group (2) I&S
Provides opportunity for students new to the major, or contemplating the major, to meet twice weekly in a small group to discuss issues relating to two designated five-credit sociology courses. Concurrent enrollment in the two five-credit designated courses required. See department adviser. Offered: ASp.

SOC 301 War (5) I&S Origins and conduct of war, readings from anthropology, political science, economics, and history, as well as two novels and some recent articles on the arms-control controversy. Modern forms of warfare, including guerrilla war, world war, and nuclear war. Offered: jointly with SIS 301.

SOC 316 Introduction to Sociological Theory (5) I&S Introduction to sociological theory. Includes classical theorists Adam Smith, Karl Marx, Emile Durkheim, and Max Weber and their influence on contemporary theoretical debate.

SOC 320 Evaluating Social Science Evidence (5) I&S, QSR *Morris* A critical introduction to the methods used to collect data in social science: surveys, archival research, experiments, and participant observation. Evaluates "facts and findings" by understanding the strengths and weaknesses of the methods that produce them. Case based. Offered: jointly with CS&SS 320/STAT 320; A.

SOC 321 Case-Based Social Statistics I (5) I&S, QSR *Handcock* Introduction to statistical reasoning for social scientists. Built around cases representing in-depth investigations into the nature and content of statistical and social-science principles and practice. Hands-on approach: weekly data-analysis laboratory. Fundamental statistical topics: measurement, exploratory data analysis, probabilistic concepts,

distributions, assessment of statistical evidence. Offered: jointly with CS&SS/STAT 321; W.

SOC 328 Methodology of Sociological Research (5-) I&S, QSR Logic of formulating, testing, and modifying hypotheses. Methods of producing social data (survey research, evaluation research, field observation) and utilizing stored data (census tapes, historical materials). Methods of quantitative data analysis techniques commonly used in contemporary sociological analysis. Not open for credit to students who have taken 320 or 323. Offered: AWS.

SOC 329 Methodology of Sociological Research (-5) I&S, QSR Logic of formulating, testing, and modifying hypotheses. Methods of producing social data (survey research, evaluation research, field observation) and utilizing stored data (census tapes, historical materials). Methods of quantitative data analysis techniques commonly used in contemporary sociological analysis. Not open for credit to students who have taken 320 or 323. Offered: WSpS.

SOC 330 Human Ecology (5) I&S Factors and forces that determine the distribution of people and institutions.

SOC 331 Population and Society (5) I&S
Guest, Lavelly Population growth and distribution, population composition, population theory, urbanization. Determinants and consequences of fertility and mortality trends and migration in economically developed and underdeveloped areas.

SOC 340 Symbolic Interaction (5) I&S Role of language and culture in changing the human organism into a socialized human being; interpersonal processes and how they are shaped by the symbolic environment.

SOC 344 Cognitive Social Psychology (5) I&S
Howard Cognitive structures and processes and their antecedents and consequences, both societal and individual. Reciprocal influences of social roles, social institutions, and social cognition.

SOC 346 Group Processes (5) I&S Systematic analysis of social processes in small groups, including conformity, deviance, cooperation, competition, coalition formation, status and role differentiation, inequity, communication, and authority and power. A variety of methods of research are considered: field studies, field experiments, laboratory studies, and the simulation of social processes.

SOC 347 National Social Movements: Current Trends and Explanations (5) I&S *Minkoff*
Introduction to theory and research on a specific form of social movement: national-level collective mobilizations organized for political change. Emphasizes how political, organizational, and cultural factors shape social movement emergence and development. Focuses on American activism, New Left, women's movements, the abortion conflict, gay/lesbian activism, and Central American Peace movement.

SOC 352 The Family (5) I&S *Pettit, Schwartz*
The family as a social institution. Historical changes and societal variation in family patterns. Changes over the life cycle. Alternative family forms.

SOC 353 The Family in Cross-Cultural Perspective (5) I&S *Scott* Form, content, and functions of families through case studies of different countries. Family organization, including family structure, inheritance, sexual division of labor, and socialization with attention given to life-cycle stages.

SOC 355 Social Change in Latin America (5) I&S Explores cultures, identities, political economy, and popular mobilization in Latin America. Examines relations of power and production between social classes and ethnic groups, as well as ideologies and intellectual movements. Offered: jointly with SISLA 355.

SOC 356 Society and Politics (5) I&S *Burstein, Kiser* Causes of political change in democratic countries, including public opinion, social movements, interest group activity, and party organization. Offered: jointly with POL S 356.

SOC 357 Sociology of Religion (5) I&S The relations between religion, polity, economy, and social structure; in particular, the political, economic, and social impact of religious beliefs and organizations, as well as the social determination of these beliefs and organizations; the rise of secularism, the rationalization of modern life, and the emergence of political quasi-religions.

SOC 360 Introduction to Social Stratification (5) I&S Social class and social inequality in American society. Status, power, authority, and unequal opportunity are examined in depth, using material from other societies to provide a comparative and historical perspective. Sociological origins of recurrent conflicts involving race, sex, poverty, and political ideology.

SOC 361 Age and Sex Differentiation (3) I&S Physiological and social bases of age and sex differentiation in human societies. The implications of age and sex distinctions for kinship, economic, and political structures. The relationship between age, sex, and other bases of social inequality.

SOC 362 Race Relations (5) I&S *Black, Pitchford* Interracial contacts and conflicts.

SOC 363 Ethnicity, Business, Unions, and Society (5) I&S *Scott* Interrelationships of ethnicity, business, unions, and the larger society. Examines financial and sociological structure of business and manufacturing sector, how this sector performs, and consequences of performance for selected ethnic groups in United States. Offered: jointly with AES 361.

SOC 364 Women in the Social Structure (5) I&S Gender and social institutions; the family, politics, education, medicine, law, the labor force. Intersection of gender with other minority statuses such as race, age, socioeconomic status, and sexual orientation. Structural, ideological, and historical determinants of gender relations.

SOC 365 Urban Community (5) I&S *Guest* Comparative and analytic study of organization and activities of urban groups.

SOC 366 Bureaucracy in Society (5) I&S *Hamilton* The coming of organizational societies; historical causes of bureaucracy; informal relations and work groups; ideologies; authority and the division of labor; social change in bureaucracies; comparative organizations.

SOC 368 Sociology of Black Americans (5) I&S *Black* Socio-cultural context of the Black person's environment and consequences of interaction with that environment. Not open for credit to students who have taken SOC 105.

SOC 371 Criminology (5) I&S *Crutchfield, Matsueda* Survey of legal definitions, types of criminal behavior, trends and patterns, recidivism, characteristics of offenders, environmental influences, diagnostic methods, prediction, theories of crime and delinquency prevention, social policy.

SOC 372 Introduction to Criminal Justice (5) I&S Examines role of police, courts, and corrections in criminal justice. Applies sociological theories and perspectives to issues in law enforcement, adjudication, and corrections. Legislative reforms. Innovations in policy.

SOC 374 Law and Society (5) I&S *Stovel* Introduces major issues of the sociological foundations and implications of legal institutions; examines social life within legal institutions, the individual and collective justice, the malleability of precedent, and truth and the effects of inequality on legal outcomes. Encompasses legal practice and social science.

SOC 376 Drugs and Society (5) I&S *Beckett* Explores the questions of drug use and abuse, social and political factors that shape response to their use, and the social conditions under which drug use is likely to have adverse consequences. Also covers U.S. drug control policy, the political economy of legal and illegal drugs, and political aspects of drug use. Offered: jointly with LSJ 376.

SOC 377 The American Jewish Community (5) I&S *Burstein* Development and current status of American Jewish community: immigration; changes in religious practice, institutions in response to circumstances in American Society; creation of new types of secular communal organizations; assimilation; confrontation with antisemitism; family life; social, economic mobility; religious, secular education; intermarriage, and future of community. Offered: jointly with SISJE 377.

SOC 378 Contemporary Jewish American Identities (5) I&S *Friedman* Introduction to the debates about post-Holocaust Jewish identities in multicultural America. Explores whether a distinctive Jewish community is headed toward assimilation, experiencing revival, or merely transforming the multiple ways Jewish experience is lived. Topics include new Jewish immigrants, the new Orthodox, Black Jews, Jewish feminism, children of Holocaust survivors. Offered: jointly with SISJE 378.

SOC 379 Environmental Sociology (5) I&S/NW *Lee* Social processes by which environmental conditions are transformed into environmental problems; scientific claims, popularization of science, issue-framing, problem-amplification, economic opportunism, and institutional sponsorship. Examination of social constructs such as ecosystem, community, and free-market economy. Use of human ecology to assess whether the current framing of environmental problems promotes ecological adaptability. Offered: jointly with ESRM 371/ENVIR 379; WS.

SOC 395 Study Abroad: Sociology (2-5, max. 15) I&S Upper-division sociology courses for which there are no direct University of Washing-

ton equivalents, taken through a University of Washington study abroad program.

SOC 399 Undergraduate Internship (2-5, max. 10) I&S Students serve in approved internships. Credit/no credit only.

SOC 401 Special Topics in Sociology (5, max. 15) I&S Selected topics of contemporary interest taught by a sociologist active in the field. Topics vary and may be substantive, theoretical, or methodological.

SOC 410 History of Sociological Thought (5) I&S Contributions of individual theorists (from Comte to the present); emphasis on cumulative development of concepts and principles, emergence of sociology as a science, probable future developments.

SOC 416 Sociological Theory (5) I&S *Kiser* Theories of individual action, social order, and institutional change. Cumulative development of solutions rather than on works of given theorists. Theories of social order. How sociological treatments of these issues compare with those offered by economists and other social scientists.

SOC 430 Urbanism and Urbanization (3) I&S Human population distribution and migration patterns. Causes and consequences of world urbanization. Spatial and social patterns in the metropolis. Aggregate population movements and selectivity of migrants.

SOC 431 Fertility and Mortality (3) I&S Theories of fertility and mortality, demographic transitions, individual variations. Specific analytic approaches. Familiarity with basic fertility and mortality measures, and with the life table, is assumed.

SOC 432 Population and Modernization (3) I&S *Hirschman, Lavelly* Examines role of demographic factors in the process of social modernization and economic growth. The approach is both historical, focusing on populations of developed countries since 1700, and analytic, stressing the attempts made by different disciplines to model demographic relationships, with attention to less-developed regions. Offered: jointly with SIS 432.

SOC 433 Research Methods in Demography (3) I&S *Hirschman* Basic measures and models used in demographic research. Sources and quality of demographic data. Rate construction, standardization, the life table, stable population models, migration models, population estimation and projection, measures of concentration and dispersion, measures of family formation and dissolution.

SOC 434 Demographic Issues in Asia (3-5) I&S *Hirschman, Lavelly* Contemporary Asian countries face a number of issues with demographic components, including environmental and resource issues, ethnic rivalries, international migration, and public health. This seminar addresses a set of these issues by focusing on the demography of one or more countries in Asia. Offered: jointly with SISEA 434.

SOC 445 Religious Movements: The Sociology of Cults and Sects (5) I&S Investigates the organizational dynamics of new religious movements. Seeks to understand why 'cults' emerge and how they proliferate or decay. Examines conflicts within established churches, counter-movements, and the state.

SOC 447 Social Movements (5) I&S *Kim* Social movements as collective attempts to change society: why people join; characteristics of successful and unsuccessful movements; consequences of social movement activities.

SOC 449 Social Relationships (5) I&S The structure of different kinds of relationships and the nature of interaction within them. Concept of social relationships in general; several specific types of relationships. Close personal relationships: marriage, nonmarital sexual relationships, and the parent-child relationship.

SOC 450 Political Economy of Women and Family in the Third World (5) I&S Theoretical and empirical aspects of the political economy of women and the family in the Third World during the process of development, with a focus on labor. Main theoretical approaches examined and applied to case studies from Asia and Latin America. Offered: jointly with SIS 450.

SOC 451 Theory and Process of Social Change (5) I&S *Hamilton* Basic trends in economic and social development; comparative and historical analysis of social and economic changes; the rise of capitalist societies.

SOC 453 Social Factors in the Family (5) I&S Review and analysis of empirical research in courtship and marriage, marital adjustment, and specific areas of marriage and family life.

SOC 456 Political Sociology (5) I&S *Burstein* Relationships between social change and political change. Focus on selected issues, including social bases of democracy, political organization, elections, and consequences of public policy.

SOC 460 Social Differentiation (5) I&S Analysis of societal organization based on sex, age, residence, occupation, community, class, caste, and race.

SOC 461 Comparative Ethnic Race Relations in the Americas (5) I&S *Scott* Sketches the ethnoracial systems operating in American society. Studies these systems as systems and examines their institutional and interpersonal dynamics. Compares ethnoracial systems in order to arrive at empirical generalizations about race/ethnorelations in the Americas. Offered: jointly with AES 461.

SOC 462 Comparative Race and Ethnic Relations (5) I&S Race and ethnicity as factors of social differentiation in a number of Western and non-Western societies in Europe, Africa, Asia, and the Americas. Offered: jointly with AES 462.

SOC 463 African-American Political Thought (5) I&S *Black* Examines the historical and sociological experiences of African-Americans from slavery, emancipation, mobilization, and organization, to present socioeconomic situation. Reviews the political philosophy of Black leaders from the early Black Conventions to today, the Black experience in the American education system, and origins and evolution of the black middle class.

SOC 464 Contemporary Society in the Peoples Republic of China (5) I&S *Lavelly* Separate development of rural and urban social institutions in the Peoples Republic of China since 1949 from a sociological perspective. Family and marriage, social control, educational institutions. Dilemmas of contemporary China

and reasons for institutional change. Offered: jointly with SISEA 464.

SOC 465 Complex Organizations (5) I&S *Hamilton* Examination of the structure of complex organizations. Attention to developing generalizations applicable to industrial organizations, businesses, hospitals, prisons, labor unions, governments, universities, armies, and similar formally instituted organizations. The major focus is on empirical research, with some attention to methodological problems in studying such organizations.

SOC 466 Economic Sociology (5) I&S *Hamilton* Changing focus of field; cultural variation, work, and the worker; technology, society, and the evolution of industrial forms; types and forms of industrial organizations; industrial organizations as social and technical systems; issues of control, process, and change; the individual in social and technical systems.

SOC 467 Immigration and Ethnicity (5) I&S *Hirshman* Focus on contemporary American diversity — the multiethnic, multicultural society created by recent immigrants from Latin America, Asia, and by people of European, African, and American Indian origins; its issues and debates, including ethnic conflict, integration, multiculturalism, and assimilation, as viewed through comparisons with the past and with other societies.

SOC 468 Sociology of Occupations and Professions (5) I&S Frameworks for study of occupations and professions; occupational structure and mobility in American society in relation to adult socialization and career development; occupational and professional associations and society.

SOC 469 Balkan Societies (5) I&S *Chirot* Examination of the roots of Balkan social problems (economic backwardness, minority-group conflicts, peasant problem), the failure of pre-1945 attempts to solve these problems, the post-1945 communist failures, the causes of the upheavals of 1989, and the prospects for success in the 1990s.

SOC 470 Contemporary Southeast Asia (5) I&S *Hirschman* Sociological survey of Southeast Asia, including development, demographic changes, family structure, and ethnic relations.

SOC 472 Juvenile Delinquency (5) I&S *Crutchfield, Weis* Factors in delinquency, juvenile courts. Programs of treatment and prevention.

SOC 473 Corrections (5) I&S Analyzes research on diversionary methods and treatment of convicted offenders. Emphasis on program evaluation. Community treatment, fines, restitution; probation, parole, halfway houses, and other alternatives to incarceration; correctional institutions. Organization of state and federal systems. Problems of administration. Subsidies and governmental control. Planning and public participation. Recommended: SOC 371; SOC 372. Offered: jointly with LSJ 473.

SOC 476 Miscarriages of Justice (5) I&S Examines legal and social factors that shape criminal case outcomes, analyzing how one type of miscarriage of justice — wrongful conviction — occur. How can cases of wrongful conviction be explained? Why are some people, against whom there is only weak evidence, convicted — and sometimes even executed? Offered: jointly with LSJ 476.

SOC 481 Issues in Analytic Sociology (5, max. 15) I&S Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

SOC 482 Issues in Analytic Sociology (3, max. 9) I&S Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

SOC 483 Issues in Analytic Sociology (1-3, max. 9) I&S Examination of current issues in sociological analysis. Specific content of the course varies according to recent developments in sociology and the interests of the instructor.

SOC 485 Family Change in Western Europe and the United States (5) I&S Investigates patterns of recent family change. Explores similarities and differences in family life between Western Europe and US as well as variations among countries and among population subgroups within countries. Focuses on differences and similarities in social, economic, political, and cultural environments. Offered: jointly with EURO 485.

SOC 486 Human Family Systems: Biological and Social Aspects (5) I&S Biological bases for human mating and reproduction, and an examination of the range of cross-cultural variability in human systems of kinship and marriage. Compares wide range of human and nonhuman species, and Western and non-Western human societies. Interplay of biological, ecological, and sociocultural factors in determining the structure and function of human family systems. Offered: jointly with ANTH 486.

SOC 487 Sociology of Gender and Sexuality (5) I&S *Schwartz* Addresses the intersection of gender and sexuality in U.S. society, social institutions and movements, families, and the individual. Topics include the history of sexuality as practiced and politicized since colonial times, major theoretical approaches to sexuality, and how gender and other social status characteristics influence the meanings of sexuality.

SOC 490 The Urban Underclass (5) I&S *Crutchfield* Examines underlying issues which have led to the emergence and perpetuation of an underclass within an affluent society. Explores some of the consequences for these people and for this society. Considers policies that might be used to address problems of the urban underclass.

SOC 492 Sociology of Education (5) I&S *LePore* Emphasizes the ways in which schools and colleges reproduce, reinforce, and challenge prevailing social, economic, and political relationships. Examines the structures, practices, content, and outcomes of schooling and its relationship to the wider society as well as the rise and dynamics of the modern education system.

SOC 494 Practicum in Sociology (5, max. 15) I&S Exploration of selected sociological concepts or problems through advanced practical experience in research, internships, or other applications. Topics vary.

SOC 495 Honors Senior Thesis (1-5, max. 5) I&S Preparation of senior honors thesis. Sociology majors only.

SOC 496 Honors Senior Seminar ([3/5]-) I&S Exploration of selected sociological problems

with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: A.

SOC 497 Honors Senior Seminar (-[3/5]-) I&S Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: W.

SOC 498 Honors Senior Seminar (-[3/5]) I&S Exploration of selected sociological problems with emphasis on research experience and the interpretation of data. For sociology majors only, primarily for honors students. Offered: Sp.

SOC 499 Undergraduate Independent Study or Research (2-5, max. 10) Credit/no credit only.

SOC 500 Teaching Sociology as a Teaching Assistant (1) Techniques of quiz section administration, advising of students, and student evaluation important to successful teaching as a Teaching Assistant. Students develop presentations and classroom materials and develop and grade student examinations. Credit/no credit only. Prerequisite: admission to graduate program in sociology.

SOC 501 Proseminar (1-3, max. 3) Introduction for first-year graduate students to substantive areas of sociology, research and information resources, and issues in graduate education and professional socialization. Credit/no credit only. Offered: A.

SOC 502 Seminar on Teaching Sociology (3) *Howard* Techniques of lecturing, leading discussion, evaluating student performance, and other pedagogical skills ancillary to successful teaching. Students develop a course and obtain videotaped feedback of presentations. Prerequisite: completion of MA. Offered: W.

SOC 503 Seminar on Writing Social Science (3) *Burstein, Howard* Techniques, skills, and strategies helpful for publishing in the social sciences. Includes writing and revision of own work and evaluation of the writing of other students. Also includes social scientific analysis of writing and other forms of academic communication. Prerequisite: completion of MA. Offered: A.

SOC 504 Applied Social Statistics (3-) I&S Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: W.

SOC 505 Applied Social Statistics (-3) I&S Applications of statistics in sociology and related social sciences. Emphasis on problems of analysis with imperfect data. Probability in statistical inference. Analysis of variance; contingency table analysis, nonparametric procedures; regression analysis in social research. Offered: Sp.

SOC 506 Methodology: Quantitative Techniques in Sociology (3) I&S Applied regression analysis with emphasis on interactive computer graphics techniques and interpretation. Application to typical sociological problems. Offered: jointly with CS&SS 507; A.

SOC 507 Statistical Classification and Measurement (3) Application of statistical

principles and methods to problems of classification and measurement in social research.

SOC 508 Logic of Social Inquiry (3) Study design from problem formulation to the analysis and interpretation of data. Offered: Sp.

SOC 509 Practicum in Data Analysis (3) Introduction to selected programs for data analysis and practice in their application. Practice in coordination research problem, data, and mode of analysis into a coherent, interrelated set. Interpretation of results. Offered: A.

SOC 510 Seminar in Sociological Theory (3) *Kiser* Macrosociological theories; functionalism and neoevolutionism; conflict and consensus approach; comparative strategies; models and long-range theories; ideology and sociology. From Marx and de Tocqueville to contemporary literature. Offered: A.

SOC 511 Classical Social Theory (3) *Chiro* Study of classical masters of social theory: Marx, Durkheim, and Weber, their precursors, and their immediate successors.

SOC 513 Demography and Ecology (3) *Hirschman* Theories and research on human fertility, mortality, mobility, migration, and urbanization in social/economic context. Comparative and historical materials on Europe, the United States, and the Third World.

SOC 514 Current Theories in Social Psychology (3) Broad graduate-level introduction to the theories in the field of social psychology.

SOC 515 Current Research in Social Psychology (3) *Howard* Broad graduate-level introduction to the research in the field of social psychology.

SOC 516 Organizations (3) *Hamilton* Broad graduate-level introduction to the theory and research on complex organizations.

SOC 517 Deviance and Social Control (3) *Bridges, Crutchfield, Weis* Survey of current research on deviant behavior and mechanisms of social control; definitions and forms of deviant behavior, causal analysis, and legal or other methods of social control.

SOC 518 Social Stratification (3) *Burstein* Intensive preparation in theoretical, methodological, and substantive topics in social stratification.

SOC 519 Fieldwork: Observation and Interviewing (3) I&S Perspective, logic, and techniques of qualitative social research and analysis. Nature and uses of intensive interviewing, participant observation, and analytic ethnography. Application of field research principles. Research project required in addition to reading and analysis of classic studies. Offered: W.

SOC 520 Fieldwork: Observation and Interviewing (-3) Logic and techniques of qualitative social research and analysis. Intensive interviewing, participant observation, qualitative data analysis (including applications of data base technology, problem reformulation, and techniques of visual documentation). Results of student work reported and discussed in class. Offered: Sp.

SOC 525 Experimental Methods in Social Research (3) For graduate students who wish additional understanding of techniques, problems, and issues involved in the design and conduct of experimental social research. Considers strengths and weaknesses of various experimental designs, artifacts and their control, problems in going from the laboratory to the field, and ethical issues. Prerequisite: SOC 504-505 and SOC 508, SOC 509, or equivalents.

SOC 526 Causal Approach to Theory Building and Data Analysis (3) Theory construction and testing from a causal models perspective. Path analysis, standardized versus unstandardized measures, feedback models, identification problems, estimation in overidentified models, difference equations, differential equations, stability conditions. Multiplicative models as alternatives to additive ones. Causal approach to measurement error.

SOC 527 Measurement of Basic Sociological Concepts (3) Conceptualization and measurement problems in sociology, using major concepts as illustrations of basic issues. Causal approach to measurement to deal with problems of indirect measurement, cross-level measurement problems, aggregation and disaggregation. Consequences of crude measurement for data analyses. Prerequisite: SOC 504; recommended: SOC 506.

SOC 528 Seminar on Selected Statistical Problems in Social Research (3) *Raftery* Prerequisite: SOC 506.

SOC 529 Structural Equation Models for the Social Sciences (3) Structural equation models for the social sciences, including specification, estimation, and testing. Topics include path analysis, confirmatory factor analysis, linear models with latent variables, MIMIC models, non-recursive models, models for nested data. Emphasizes applications to substantive problems in the social sciences. Prerequisite: SOC 504, SOC 505, SOC 506 or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with CS&SS 526.

SOC 535 Research Issues in Demography and Population Studies (1-2, max. 7) Interdisciplinary seminar on current research issues in demography and population studies. Critical analysis and discussion of readings drawn from anthropological, economic, geographic, and sociological approaches. Offered: AWSp.

SOC 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) *Raftery* Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus. Prerequisite: SOC 504, SOC 505, SOC 506, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with STAT 536/CS&SS 536.

SOC 537 Modeling Emergence: Social Simulation (3) Seminar and practicum in computational modeling of social processes with emphasis on using agent-based simulation models to investigate and refine theory.

SOC 539 Selected Topics in Demography and Ecology (3, max. 9) Specialized problems in demography or ecology are covered; for example, migration, fertility, mortality, language, race and ethnic relations, metropolitan

community. See quarterly announcement for specific problem to be covered.

SOC 542 Selected Topics in Group Processes (3) Theories, methodology, and studies in the area of small-group research. Prerequisite: permission of instructor for nonmajors.

SOC 543 Seminar on Group Solidarity (3) Interdisciplinary perspectives on solidarity, focusing on member commitment, group structure, and contributions to collective goals.

SOC 544 Seminar on Social Power (3) Examination of basic principles concerning power, influence, and authority in small groups, organizations, and communities.

SOC 546 Seminar on Symbolic Interaction (3) Focuses on several key areas in, and related to, the symbolic interactionist perspective (e.g., language, the self, the dramaturgic perspective, ethnomethodology, stigma, the social construction of social problems). Prerequisite: permission of instructor for nonmajors.

SOC 547 Social Cognition and Attribution (3) *Howard* Theories and research on social cognition and attribution. Theoretical and methodological debates on cognition. Sociological aspects of attribution. Prerequisite: SOC 514 or equivalent.

SOC 550 Changing Patterns of Family Organization (3) *Schwartz* History of the family with emphasis on changes in European and American families since 1600. Concomitant changes in other institutions and their relation to changes in the family.

SOC 551 Family and Gender Relations (3) *Schwartz* Overview of major research findings on marriage, the family, and gender, including demographic trends, the place of children in society, courtship, the internal management of intimate relationships, divorce, and social policy.

SOC 553 Seminar on Gender and Sexuality (3) Research seminar considering theoretical and empirical approaches to sexuality, with particular attention to the importance of gender. Examines the social control of sexuality by the state and by families, as well as social meanings of sexuality within social movements related to various aspects of sexuality.

SOC 554 Seminar in the Sociology of Religion (3) Survey of significant and active areas of theory and research in contemporary social scientific studies of religion.

SOC 555 Methods in Macro, Comparative, and Historical Sociology (3) Systems of conducting research with qualitative methods brought to bear on broad questions.

SOC 556 The Evolution of the Family (3) Biological evolution of species-specific behaviors and forms of sociality linked to human mating, reproduction, and parenting. Cultural evolution of human systems of kinship and marriage as fitness-maximizing adaptations to a wide range of habitats. Prerequisite: upper-division course in evolutionary theory, population genetics, behavioral ecology, primatology, or animal behavior. Offered: jointly with ANTH 556.

SOC 559 Seminar on Gender Roles (3) *Brines, Howard* Broad graduate-level introduction to theoretical issues concerning gender and society. Current state of empirical knowledge on the

sociology of gender and strategies for research. Cross-cultural variations in conception of gender roles and how gender intersects with social institutions and social interactions.

SOC 562 Seminar in Comparative Race Relations (3) Cross-cultural approach to race and ethnic relations, including case studies from Africa and Latin America. Prerequisite: graduate standing in social sciences.

SOC 565 Inequality: Current Trends and Explanations (3) *Morris* Discussion of recent growth in economic inequality in the U.S. and competing explanations for these new trends through examination of labor market demographics, industrial composition and restructuring, and the broader political context that impacts policies like minimum wage, strength of unions, and foreign trade. Prerequisite: SOC 504, SOC 505, SOC 506, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with CS&SS 565.

SOC 566 Seminar in Complex Organizations (3) Special topic seminars in the field of complex organizations or industrial sociology.

SOC 567 Seminar in Complex Organizations (3) Special topic seminars in the field of complex organizations or industrial sociology.

SOC 568 Social Mobility (3) Description and measurement of social mobility. Determinants of mobility and cross-national comparisons. Consequences of mobility for social behaviors. Emphasizes movement from the socioeconomic position of family of origin to adult position. Prerequisite: SOC 518.

SOC 569 Demographic Studies of Stratification (3) *Hirschman* Overview of development of models of socioeconomic achievement ("status attainment" paradigm) in the field of stratification. Begins with work of Blau and Duncan. Covers elaboration of basic models to include race and ethnicity, social psychological variables, class, school and labor market effects, and other structural variables. Prerequisite: SOC 513, SOC 518.

SOC 570 Seminar on Environmental Sociology (3) *Lee* Perspectives on environmental sociology, with emphasis on the social construction of environmental problems. European and American schools of thought and their implications for environmental policy. Examination of global and regional issues in the context of risk society. Offered: jointly with CFR 570; A.

SOC 574 Seminar in Methods of Criminological Research (3) *Bridges, Weis* Provides training in the technical analysis of published research in criminology; designs and processes studies in parole prediction, prediction of prison adjustment, and prediction of treatment effect.

SOC 575 Social Movements: Politics and Organization (3) Theoretical perspectives and research on the dynamics of national social movements from a macrosociological perspective. Introduces dominant models that stress organizational and political processes, with some examination of approaches that consider the intersection of politics, organization, and culture. Emphasis on the United States.

SOC 581 Special Topics in Theory and the History of Sociological Thought (3, max. 9) Examination of current topics in theory and the

history of sociological thought. Content varies according to recent developments in the field and the interests of the instructor.

SOC 582 Special Topics in Research Methods and Statistical Analysis in Sociology (3, max. 9) Examination of current topics in research methods and statistical analysis in sociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 583 Special Topics in Demography and Ecology (3, max. 9) Examination of current topics in demography and ecology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 584 Special Topics in Social Psychology (3, max. 9) Examination of current substantive topics in social psychology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 585 Special Topics in Marriage and Family (3, max. 9) Examination of current substantive topics in marriage and the family. Content varies according to recent developments in the field and the interests of the instructor.

SOC 586 Special Topics in Organization and Industrial Sociology (3, max. 9) *Reitman* Examination of current substantive topics in organizational and industrial sociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 587 Special Topics in Deviance and Social Control (1-3, max. 9) Examination of current substantive topics in deviance and social control. Content varies according to recent developments in the field and the interests of the instructor.

SOC 588 Special Topics in Stratification and Race Relations (3, max. 9) Examination of current substantive topics in stratification and race relations. Content varies according to recent developments in the field and the interests of the instructor.

SOC 589 Special Topics in Macrosociology (3, max. 9) Examination of current substantive topics in macrosociology. Content varies according to recent developments in the field and the interests of the instructor.

SOC 590 Special Topics in Sociology (1-3, max. 9) Examination of current substantive topics in sociology. Content varies according to recent developments in the field and the interests of the instructor. Topics covered in courses with this number lie outside those covered by other special topics courses numbered 581 through 589.

SOC 591 Political Sociology (3) Introduction to political sociology, considering the rise of the modern state, power, political organization, social movements, and other related topics.

SOC 600 Independent Study or Research (*) Credit/no credit only.

SOC 700 Master's Thesis (*) Credit/no credit only.

SOC 800 Doctoral Dissertation (*) Credit/no credit only.

Speech and Hearing Sciences

SPHSC 100 Voice and Articulation Improvement (3) VLPA For native speakers of English only. Voice production and the sound system of standard American speech. Speech standards, regional and social dialects, voice quality and basic language-oriented characteristics. Practice for improving speech style. May not be repeated. Offered: AWSpS.

SPHSC 111 The American English Sound System (2, max. 4) For non-native speakers of English only. Speech sounds of American English. Practice in listening and using American speech sounds and intonation patterns. Credit/no credit only. Offered: AWSpS.

SPHSC 250 Human Communication and Its Disorders (5) I&S/NW Overview of normal and impaired human communication, including speech, language, and hearing disorders. Required for majors, open to nonmajors. Offered: AS.

SPHSC 302 Phonetics (3) VLPA Introduction to the description and classification of speech sounds with a focus on American English. Phonetic analysis of segmental and suprasegmental properties of speech. Practice using the International Phonetic Alphabet to transcribe normal and disordered speech patterns. Required for majors; open to nonmajors. Prerequisite: either SPHSC 303, LING 200, or LING 400. Offered: W.

SPHSC 303 Language Science (3) VLPA Introduction to techniques of linguistic analysis used in the study of phonology, morphology, syntax, and semantics. Required for majors; open to nonmajors. Offered: A.

SPHSC 304 Developmental Aspects of Communication (5) I&S Patterns of communicative development in English speaking children and adolescents. Introduction to the study of language and communication from a developmental perspective. Application to children with various types of communication impairments. Required for majors; open to nonmajors. Prerequisite: either SPHSC 303, ANTH 203, LING 200, or LING 400; may not be repeated. Offered: Sp.

SPHSC 305 Speech and Language Disorders (5) NW Etiology and nature of developmental and acquired communication disorders across the lifespan. Behavioral characteristics of language delay and disorders, developmental apraxia of speech, phonological disorders, stuttering, acquired aphasia, apraxia of speech and dysarthria, craniofacial anomalies, and voice disorders. Required for majors; open to nonmajors. Prerequisite: SPHSC 302; SPHSC 304; SPHSC 320. Offered: A.

SPHSC 308 Social-Cultural Aspects of Communication (3) I&S Introduction to human communication in context. Exploration of ways communication is influenced by context, including situational, social/interpersonal, and cultural variables. Studies systems and cultural practices as they influence communication. Required for majors; open to nonmajors. Offered: WSu.

SPHSC 320 Anatomy and Physiology of Speech (5) NW Anatomy and physiology of the respiratory, laryngeal, and articulatory systems. Examples and laboratory work are directed toward clinical issues in Speech-Language

Pathology. Required for majors; open to nonmajors. Offered: Sp.

SPHSC 371 Hearing Disorders (3) I&S/NW Introduction to abnormal hearing. Pathologies of the ear and their treatments. Audiometric correlates, communicative and social consequences of hearing loss. Overview of management of children and adults. Required for majors; open to nonmajors. Offered: ASpS.

SPHSC 391 Practicum in Audiology (1-4, max. 10) Guided experiences in audiological assessment and aural rehabilitation of children and adults. Credit/no credit only. Offered: AWSpS.

SPHSC 405 Diagnosis of Speech and Language Disorders (3) NW Principles and procedures for the diagnosis of speech and language disorders. Required for majors. Prerequisite: SPHSC 305. Offered: W.

SPHSC 406 Treatment of Speech and Language Disorders (4) NW Principles and procedures for planning, implementing, and evaluating treatment for speech and language disorders. Required for majors. Prerequisite: SPHSC 405; may not be repeated. Offered: SpS.

SPHSC 411 Perceptual Development (5) I&S/NW Meltzoff Origins and development of perception in human infancy. Object, face, and speech perception; cross-modal relations between touch, vision, audition. Prerequisite: 2.0 in either PSYCH 206, PSYCH 306, or PSYCH 414. Offered: jointly with PSYCH 411.

SPHSC 425 Speech, Language, and the Brain (5) NW Historical perspectives and current research on speech acoustics, speech perception, and brain processing of speech information; speech development; techniques used in speech analysis; machine recognition of speech; brain imaging techniques, animal communication systems; speech evolution; implications for impaired populations. May not be repeated. Offered: A.

SPHSC 445 Models of Speech Processing (3) NW Examines models and basic issues concerning how spoken language is processed. Presents current issues, theories, and research relative to the levels of processing entailed in producing and comprehending speech. Required for majors; open to nonmajors. Recommended: SPHSC 302; SPHSC 303; SPHSC 320; SPHSC 425. Offered: SpS.

SPHSC 449 Special Studies in Speech Pathology and Audiology (*, max. 30) Selected special problems in speech pathology and audiology. Offered: S.

SPHSC 453 Augmentative and Alternative Communication: Implementation Strategies (2-3) NW Communication needs of nonspeaking individuals. Interdisciplinary approaches to the evaluation, selection, and implementation of aided and unaided communication augmentation systems. Recommended: basic course work in either SPHSC, OT, PT, or ENGR. Offered: jointly with REHAB 458; S.

SPHSC 454 Augmentative and Alternative Communication: Access for Technology (3) NW Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for

clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with REHAB 459.

SPHSC 461 Introduction to Hearing Science (5) NW Basic aspects of hearing and the ear and auditory nervous system. How the auditory system constructs an image of the acoustic environment. How attention and memory influence hearing. Effects of damage to the auditory system. Prerequisite: either SPHSC 261 or PSYCH 333. Offered: Sp.

SPHSC 462 Hearing Development (3) NW Description of the changes that occur in human hearing during development. Consideration of the possible explanations for early immaturity. Prerequisite: SPHSC 461; may not be repeated. Offered: even years; A.

SPHSC 471 Basic Audiometry (5) NW Theory and practice of the assessment of hearing function, including standard pure-tone audiometry, speech audiometry, and basic impedance audiometry. Required for majors. Prerequisite: SPHSC 371; SPHSC 461; may not be repeated. Offered: AWS.

SPHSC 481 Management of Hearing Loss (4) NW Introduction to methods of communicative rehabilitation of person with hearing loss. Remediation principles of auditory and visual perception, amplification, communication strategies, and information counseling. Required for majors. Prerequisite: SPHSC 471; may not be repeated. Offered: WSp.

SPHSC 491 Audiology Practicum in Schools (2) Special projects in clinical audiology practicum, offered only in the school setting. Provides an opportunity for students to extend audiology practicum experiences into the school environment. Prerequisite: SPHSC 471. Offered: AS.

SPHSC 499 Undergraduate Research (1-5, max. 15) Offered: AWSpS.

SPHSC 500 Clinical Methodology for Documenting Change (4) Introduction to clinical methodology for examining efficacy of treatments for individuals with communication problems. Students consider nature of intervention designed to alter communication disorders and types of accountability questions that need to be raised. They learn methodology for collecting and analyzing data to document effectiveness, effects, and efficiency of treatments.

SPHSC 501 Neural Bases of Speech, Language, and Hearing (4) Neuroanatomical and neurophysiological bases of language, hearing, sensory, and motor function. Special emphasis given to brain behavior correlates and behavioral consequences to speech, language, and hearing as a result of neurologic injury or disease.

SPHSC 502 Advanced Anatomy of Speech and Hearing Structures (2) Directed independent dissection and study of selected anatomic structures of the speech or hearing mechanisms.

SPHSC 503 Current Issues in Speech and Hearing Sciences (3) Application of experimental methods to research in speech and hearing sciences.

SPHSC 504 Research Methods in Speech and Hearing Sciences (3) Introduction to empirical methods in the speech and hearing sciences.

SPHSC 505 Clinical Research in Communication Disorders (3) Introduction to clinical research. Methodological issues concerning the evaluation of treatment for speech, hearing, and language disorders. Primary emphasis on time series designs. Prerequisite: SPHSC 504 or permission of instructor.

SPHSC 509 Advanced Hearing Science (3) Souza Consideration of physiological acoustics and psychoacoustics, the pertinent literature, and the experimental techniques related to study in these areas. Offered: A.

SPHSC 510 Physiological Acoustics (3) Study of pertinent literature and experimental techniques incident to the physiology of the normal and abnormal auditory system. Prerequisite: SPHSC 461.

SPHSC 511 Psychoacoustics (3) Review of significant literature and theory pertinent to normal auditory sensitivity, pitch, loudness, and other attributes of auditory sensation. Prerequisite: SPHSC 461, SPHSC 510.

SPHSC 514 Speech Physiology (3) Study of the physiological parameters of acoustic speech production. Prerequisite: SPHSC 320, SPHSC 461.

SPHSC 515 Speech Acoustics (3) Study of the acoustical correlates of the distinctive parameters of speech. Prerequisite: SPHSC 320, SPHSC 461, SPHSC 514.

SPHSC 516 Speech Perception (3) Study of the perceptual and linguistic parameters of speech perception. Prerequisite: SPHSC 320, SPHSC 461, SPHSC 515.

SPHSC 519 Seminar in Speech Science (2, max. 6) .

SPHSC 520 Advanced Instrumentation for Speech and Hearing Sciences (3) Design and use of electronic and electroacoustic devices in the speech and hearing sciences. Four hours of laboratory required each week.

SPHSC 521 Instrumentation for Audiology (4) Introduction to basic instrumentation used in audiology and hearing science; detailed instruction in audiometer calibration including a review of current national and international standards pertinent to audiology; emphasis on use rather than theory. Prerequisite: permission of instructor.

SPHSC 522 Hearing Instrument Modification/Repair (1) Minor repair of hearing aids or associated accessories. Includes operation of hand tools and small power tools used in repair. Familiarity with different materials used to make or repair hearing aids/accessories. Troubleshooting damaged, malfunctioning, or inoperative instruments. Interpreting acoustic and electroacoustic test results to aid in troubleshooting or repair.

SPHSC 523 Special Topics (3) Applied and theoretical issues related to audiology. Weekly seminar includes guest speakers discussing current and future trends in science that relate to hearing and the practice of audiology.

SPHSC 525 Speech Signal Processing (3) Theory, evaluation, and use of speech signal processing algorithms such as sampling, filtering, spectral analysis, autocorrelation, and speech synthesis. Laboratory assignments develop skills

in using signal analysis and synthesis software applied to normal and pathological speech.

SPHSC 531 Neurogenic Motor Speech Disorders (4) The nature of apraxia of speech and dysarthria and the assessment and treatment of those disorders. Prerequisite: SPHSC 501 or permission of instructor.

SPHSC 533 Medical Speech Pathology (3) Nature of speech pathology practiced in medical settings. Prerequisite: SPHSC 501, SPHSC 531, and SPHSC 532, or permission of instructor.

SPHSC 534 Special Topics in Dysphagia and Associated Disorders (2, max. 4) Anatomophysiological bases of function and dysfunction associated with speech-language disorders. Mastication and swallowing problems, their causes, assessments, and management. Prerequisite: SPHSC 501 or permission of instructor.

SPHSC 535 Voice and Resonance Disorders (4) Physiology, acoustics, and perception of voice quality and speech resonance. Etiology, evaluation, and treatment of voice and resonance disorders.

SPHSC 537 Fluency Disorders (4) Characteristics of fluent speech and the nature and treatment of stuttering in children and adults are studied in relation to normal speech production processes, human learning, principal explanations of stuttering, and treatment systems.

SPHSC 538 Management of Acquired Cognitive Disorders (2) Epidemiology, neuropathology, assessment, and management of acquired cognitive disorders. Focus on traumatic brain injury in adults and children, dementia, and right brain injury. Prerequisite: SPHSC 501 and SPHSC 532 or permission of instructor.

SPHSC 540 Phonological Development (3) Selected topics in the developmental sequence of phonological systems in normal-speaking children. Relationships between possible phonological inventories and rule systems in different languages. Prerequisite: LING 451, LING 452, or permission of instructor. Offered: jointly with LING 540.

SPHSC 542 Counseling and Interactive Skills for Speech-Language Pathologists and Audiologists (2-3) Introduction to counseling theory and practice in speech-language pathology, audiology, and related fields. Provides opportunities for learning and practicing counseling skills. Addresses key counseling issues, including professional boundaries, intense emotions, and counselor's feelings and reactions. Prerequisite: graduate standing or permission of instructor.

SPHSC 551 Advanced Practicum in Speech Pathology Evaluation (1-10, max. 10) Laboratory experience in the evaluation of speech and language disorders. Credit/no credit only. Prerequisite: SPHSC 536 and permission of instructor.

SPHSC 552 Advanced Practicum in Speech Pathology Management (1-10, max. 10) Laboratory experience in the management of speech and language disorders. Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 555 Preinternship in Speech and Hearing Sciences (1-10, max. 10) Practicum in

speech pathology or audiology designed to teach the clinical regimen of a participating professional center prior to assuming a full internship assignment. Credit/no credit only.

SPHSC 560 Studies in Speech Science and Disorders (3) Examines contemporary models and research paradigms in speech science and disorders. Topics include respiratory physiology, laryngeal physiology, aerodynamics of speech production, articulatory dynamics, speech acoustics, and speech perception.

SPHSC 561 Studies in Hearing Sciences and Disorders (3) Examines contemporary models and research paradigms in the area of hearing science and disorders. Topics include psychoacoustics; amplification; electrophysiological evaluation; physiological acoustics; and perceptual consequences of hearing loss.

SPHSC 562 Studies in Language Science and Disorders (3) Examines research in the area of language science and disorders including word recognition and production; storage of retrieval of word form and meaning; comprehension and production of sentences and discourse; and language in social context. Topics examined relative to development, language impairments, and normal language processing.

SPHSC 563 Proseminar: Instructional Development Forum (1, max. 3) *Olswang* Emphasizes instructional techniques and issues as they relate to teaching in the discipline of communication sciences and its disorders. Topics include course development, grading, student-faculty relations, teaching methods, and diversity. Credit/no credit only. Prerequisite: graduate standing in Speech and Hearing Sciences.

SPHSC 564 Teaching Practicum (1-5, max. 5) Provides experience in preparing and giving lectures, leading discussions, preparing and grading assignments and tests, and working directly with undergraduate and graduate students. Prerequisite: doctoral student standing and permission of instructor. Credit/no credit only. Offered: AWSpS.

SPHSC 565 Speech and Language Pathology Proseminar (1, max. 6) Consideration of professional issues and student and faculty research. Credit/no credit only.

SPHSC 566 Seminar in Speech-Language Development (2, max. 6) Prerequisite: permission of instructor.

SPHSC 567 Research Seminar in Speech and Hearing Sciences (1) A platform for the presentation and exchange of scientific information (research data, new hardware and hardware development, scientific papers) resulting from ongoing research projects by graduate students and faculty within the Speech and Hearing Sciences department. Credit/no credit only.

SPHSC 568 Grant Writing in Hearing, Language, and Speech Science (3) Design and writing of grant proposals in speech, language, and hearing sciences and disorders. Explanation of the funding process at various agencies, particularly the National Institutes of Health. Students prepare a proposal and review the proposals of their peers. Prerequisite: upper-level doctoral standing and permission of instructor.

SPHSC 569 Seminar in Speech-Language Pathology (2, max. 6) .

SPHSC 570 Assessment of Auditory Dysfunction I (4-) Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

SPHSC 571 Assessment of Auditory Dysfunction II (-4) Strategies and procedures in the auditory evaluation of hearing-impaired adults. Use of diagnostic tests in the evaluation of auditory pathologies. Laboratory required. Prerequisite: SPHSC 471.

SPHSC 572 Pediatric Audiology (3) Assessment of auditory disorders in infants and young children. Emphasis on behavioral and electrophysiologic techniques and on the role of the audiologist in the clinical management of the young hearing-impaired child. Prerequisite: SPHSC 471 or equivalent.

SPHSC 574 Assessment of Balance Function (4) Examines normal anatomy and physiology of the peripheral and central vestibular system. Reviews peripheral and central vestibular disorders and treatment protocols. Major focus of assessment on electronystagmography with associated lab. Provides overview of rotational and posturography measures of balance function. Prerequisite: permission of instructor.

SPHSC 575 Medical Backgrounds in Audiology (3) Diseases and injuries of the ear resulting in reduced audition. Prerequisite: SPHSC 571 or permission of instructor.

SPHSC 576 Otoacoustic Emissions (2) Consideration of otoacoustic emissions and the physiologic techniques used to record them. Includes interpretation of responses in both the normal and disordered auditory system as well as clinical application of emissions in both adult and infant populations. Laboratory required. Prerequisite: SPHSC 571, SPHSC 572, and SPHSC 573, or permission of instructor.

SPHSC 577 Industrial and Community Hearing Conservation (2) Psychophysiological effects of environmental noise on man. Techniques of noise measurement and attenuation, including the planning of hearing conservation programs in industry and in the community. Prerequisite: SPHSC 471 or permission of instructor.

SPHSC 578 Hearing Screening (2) Consideration of hearing screening programs and the statistical techniques used to evaluate them. Includes history, rationale, and technical aspects of hearing screening as well as current models for developing neonatal, school-age, and adult hearing screening programs. Prerequisite: SPHSC 572, SPHSC 573, and SPHSC 576, or permission of instructor.

SPHSC 579 Geriatric Audiology (2) Examines the biological, psychological, and social aspects which are normal correlates of the aging process, and those changes which are disorders. Emphasizes the identification and diagnosis of hearing problems associated with the aging process and its rehabilitation. Prerequisite: SPHSC 571.

SPHSC 580 Rehabilitative Audiology (3) Explores technology to enhance communication effectiveness of hearing impaired persons. Selection and training in the use of assistive systems and cochlear implants. Advanced perception assessment and training methodology. Prerequisite: SPHSC 571 and SPHSC 583.

SPHSC 581 Management of Hearing-Impaired Children (2) Management of hearing-impaired children, including identification of target behaviors and methods for modification such as individualized therapy programs and parent and teacher involvement.

SPHSC 582 Hearing Aid Amplification (4) Acoustic amplification and methods of determining electroacoustic characteristics. Includes earmold technology. Prerequisite: SPHSC 471 and SPHSC 570 or permission of instructor.

SPHSC 583 Hearing Aid Selection (4) Consideration of strategies utilized in selecting acoustic amplification for the hearing impaired, including review of pertinent research literature. Prerequisite: SPHSC 582 or permission of instructor.

SPHSC 584 Advanced Amplification (3) Current topics in hearing aids and amplification technology; review of pertinent research articles. Prerequisite: SPHSC 582, 583.

SPHSC 585 Pediatric Amplification (2) Consideration of strategies utilized in selecting and verifying acoustic amplification for infants and children, including review of pertinent research literature. Prerequisite: SPHSC 582 or permission of instructor.

SPHSC 586 Cochlear Implants (2) Basics of cochlear implant technology and programming strategies. Evaluation of prospective users, monitoring, and coupling with other devices. Rehabilitation techniques and materials.

SPHSC 587 Ethics (1) Analysis and discussion of ethical considerations in the clinical practice of audiology, codes of professional organizations, and additional consideration of research ethics and ethics in neonatal hearing screening.

SPHSC 588 Audiology Proseminar (1, max. 3) Consideration of professional issues and student/faculty research in specific areas of interest. Credit/no credit only.

SPHSC 589 Seminar in Audiology (2, max. 6) Prerequisite: permission of instructor.

SPHSC 590 Cerumen Management for Audiologists (1) Review of anatomy and physiology of the external auditory canal. Examination of the physiology and pathophysiology of cerumen. Instrumentation of examining and cleaning the ear canal. Cerumen management procedures including otoscopy with normal and abnormal findings. Contraindications for cerumen management. Discussion of scope of practice, medical/legal issues, and reimbursement.

SPHSC 591 Advanced Practicum in Audiology (1-10, max. 10) Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 593 Electrophysiologic Assessment II (3) *Tremblay* Examines evoked and event-related potentials including recording techniques, neurophysiological mechanisms, and applications to clinical populations. Offered: Sp.

SPHSC 599 Research Practicum (*, max. 12) Supervised laboratory experience in experimental approach to problems in speech and hearing sciences. Prerequisite: permission of instructor.

SPHSC 600 Independent Study or Research (*, max. 10) Prerequisite: permission of instructor.

SPHSC 601 Internship (1-10, max. 10) Supervised field experiences in settings other than public schools. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

SPHSC 602 Internship in the Schools (3-10, max. 10) Supervised field experience in a public school setting. Credit/no credit only. Prerequisite: permission of instructor.

SPHSC 700 Master's Thesis (*, max. 10) .

SPHSC 800 Doctoral Dissertation (*, max. 10).

Statistics

STAT 111 Lectures in Applied Statistics (1) NW Weekly lectures illustrating the importance of statisticians in a variety of fields, including medicine and the biological, physical, and social sciences. Contact instructor for information on emphasized fields of applications. Credit/no credit only. Offered: jointly with BIOST 111; Sp.

STAT 220 Basic Statistics (5) NW, QSR Objectives and pitfalls of statistical studies. Structure of data sets, histograms, means, and standard deviations. Correlation and regression. Probability, binomial and normal. Interpretation of estimates, confidence intervals, and significance tests. (Students may receive credit for only one of 220, 311, and ECON 311.) Offered: AWSpS.

STAT 311 Elements of Statistical Methods (5) NW, QSR Elementary concepts of probability and sampling; binomial and normal distributions. Basic concepts of hypothesis testing, estimation, and confidence intervals; t-tests and chi-square tests. Linear regression theory and the analysis of variance. (Students may receive credit for only one of 220, 311, and ECON 311.) Prerequisite: either MATH 111, MATH 120, MATH 124, MATH 127, or MATH 144. Offered: AWSpS.

STAT 316 Design of Experiments and Regression Analysis (4) NW *Kapur* Introduction to the analysis of data from planned experiments. Analysis of variance for multiple factors and applications of orthogonal arrays and linear graphs for fractional factorial designs to product and process design optimization. Regression analysis with applications in engineering. Prerequisite: IND E 315. Offered: jointly with IND E 316.

STAT 320 Evaluating Social Science Evidence (5) I&S, QSR A critical introduction to the methods used to collect data in social science: surveys, archival research, experiments, and participant observation. Evaluates "facts and findings" by understanding the strengths and weaknesses of the methods that produce them. Case based. Offered: jointly with CS&SS 320/SOC 320; A.

STAT 321 Case-Based Social Statistics I (5) I&S, QSR *Handcock* Introduction to statistical reasoning for social scientists. Built around cases representing in-depth investigations into the nature and content of statistical and social-science principles and practice. Hands-on approach: weekly data-analysis laboratory. Fundamental statistical topics: measurement, exploratory data analysis, probabilistic concepts, distributions, assessment of statistical evidence. Offered: jointly with CS&SS/SOC 321; W.

STAT 342 Introduction to Probability and Statistical Inference II (4) NW Brief review of: sample spaces, random variables, probability. Distribution: binomial, normal, Poisson, geometric. Followed by: expectation, variance, central limit theorem. Basic concepts of estimation, testing, and confidence intervals. Maximum likelihood estimators and likelihood ratio tests, efficiency. Introduction to regression. Prerequisite: STAT 341. Offered: Sp.

STAT 390 Probability and Statistics in Engineering and Science (4) NW Concepts of probability and statistics. Conditional probability, independence, random variables, distribution functions. Descriptive statistics, transformations, sampling errors, confidence intervals, least squares and maximum likelihood. Exploratory data analysis and interactive computing. Students may receive credit for only one of 390, STAT/ECON 481, and ECON 580. Prerequisite: either MATH 126 or MATH 136. Offered: jointly with MATH 390; AWSpS.

STAT 391 Probability and Statistics for Computer Science (4) NW *Meila* Fundamentals of probability and statistics from the perspective of the computer scientist. Random variables, distributions and densities, conditional probability, independence. Maximum likelihood, density estimation, Markov chains, classification. Applications in computer science. Prerequisite: 2.5 in MATH 126; 2.5 in MATH 308; either CSE 326, CSE 373, CSE 417, or CSE 421.

STAT 394 Probability I (3) NW Sample spaces; basic axioms of probability; combinatorial probability; conditional probability and independence; binomial, Poisson and normal distributions, central limit theorem. Prerequisite: either 2.0 in MATH 126, or 2.0 in MATH 136; recommended: MATH 324 or MATH 327. Offered: jointly with MATH 394; AWS.

STAT 395 Probability II (3) NW Random variables; expectation and variance; laws of large numbers; normal approximation and other limit theorems; multidimensional distributions and transformations. Prerequisite: 2.0 in STAT/MATH 394. Offered: jointly with MATH 395; WSpS.

STAT 396 Probability III (3) NW Characteristic functions and generating functions; recurrent events and renewal theory; random walk. Prerequisite: either 2.0 in MATH 395 or 2.0 in STAT 395. Offered: jointly with MATH 396; Sp.

STAT 400 Mathematical Communication for Undergraduates (2) NW Techniques of effective writing and oral presentations in the mathematical sciences. Offered: jointly with AMATH 400/ MATH 400. Prerequisite: at least 15 credits in MATH, STAT, AMATH, or CSE at the 300 or 400 level, including MATH 307 or AMATH 351 and MATH 308 or AMATH 352.

STAT 403 Introduction to Resampling Inference (4) NW Introduction to computer-intensive data analysis for experimental and observational studies in empirical sciences. Students design, program, carry out, and report applications of bootstrap resampling, rerandomization, and subsampling of cases. Credit allowed for 403 or 503 but not both. Prerequisite: either STAT 220, STAT 301, STAT/ ECON 311, STAT 341, STAT 361, STAT/MATH 390, or STAT/ECON 481. Offered: Sp.

STAT 421 Applied Statistics and Experimental Design (4) NW Computer-aided data analyses using comparisons between batches, analysis of variance and regression. Evaluation of

assumptions, data transformation, reliability of statistical measures (jackknife, bootstrap). Fisher-Gosset controversy. Prerequisite: either STAT 342, STAT/MATH 390, or STAT/ECON 481; recommended: MATH 308. Offered: A.

STAT 423 Applied Regression and Analysis of Variance (4) NW Regression analysis. Problems in interpreting regression coefficients. Estimation, including two-stage least squares. Guided regression: building linear models, selecting carriers. Regression residuals. Analysis of variance. Nonparametric regression. Factorial designs, response surface methods. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, or STAT/ECON 481; recommended: MATH 308. Offered: W.

STAT 425 Introduction to Nonparametric Statistics (3) NW Overview of nonparametric methods, such as rank tests, goodness of fit tests, 2 x 2 tables, nonparametric estimation. Useful for students with only a statistical methods course background. Prerequisite: STAT/MATH 390. Offered: jointly with BIOST 425; when demand is sufficient.

STAT 427 Introduction to Analysis of Categorical Data (4) NW Techniques for analysis of count data. Log-linear models, logistic regression, and analysis of ordered response categories. Illustrations from the behavioral and biological sciences. Computational procedures. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

STAT 428 Multivariate Analysis for the Social Sciences (4) NW Multivariate techniques commonly used in the social and behavioral sciences. Linear models for dependence analysis (multivariate regression, MANOVA, and discriminant analysis) and for interdependence analysis (principal components and factor analysis). Techniques applied to social science data using computer statistical packages. Prerequisite: either STAT 342, STAT 362, or STAT 421. Offered: alternate years.

STAT 480 Sampling Theory for Biologists (3) NW *Gallucci, Rustagi* Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 480; even years.

STAT 481 Introduction to Mathematical Statistics (5) NW Probability, generating functions; the d-method, Jacobians, Bayes theorem; maximum likelihoods, Neyman-Pearson, efficiency, decision theory, regression, correlation, bivariate normal. (Credit allowed for only one of 390, 481, and ECON 580.) Prerequisite: STAT/ECON 311; either MATH 136 or MATH 126 with either MATH 308 or MATH 309. Recommended: MATH 324. Offered: jointly with CS&SS/ECON 481; A.

STAT 486 Experimental Design (3) NW Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency, power, sample size, pseudoreplication, factor structure. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with Q SCI 486.

STAT 492 Stochastic Calculus for Option Pricing (3) NW Introductory stochastic calculus mathematical foundation for pricing options and derivatives. Basic stochastic analysis tools, including stochastic integrals, stochastic differential equations, Ito's formula, theorems of Girsanov and Feynman-Kac, Black-Scholes option pricing, American and exotic options, bond options. Prerequisite: MATH STAT 394-5. Offered: jointly with MATH 492; W.

STAT 498 Special Topics (1-5, max. 15) NW Reading and lecture course intended for special needs of students. Offered: when demand is sufficient.

STAT 499 Undergraduate Research (1-5, max. 15) Offered: AWSpS.

STAT 500 Mathematical Communication for Graduates (2) Analysis and practice of mathematical writing. Oral and poster conference presentations. Academic job interview skills. Mathematics on the web. Offered: jointly with AMATH 580/MATH 500.

STAT 502 Design and Analysis of Experiments (4) Design of experiments covering concepts such as randomization, blocking, and confounding. Analysis of experiments using randomization tests, analysis of variance, and analysis of covariance. Prerequisite: either STAT 342, MATH/STAT 390, ECON/STAT 481, ECON 580 or equivalent; MATH 308 or equivalent. Offered: A.

STAT 504 Applied Regression (4) Least squares estimation. Hypothesis testing. Interpretation of regression coefficients. Categorical independent variables. Interactions. Assumption violations: outliers, residuals, robust regression; nonlinearity, transformations, ACE, CART; nonconstant variance. Variable selection and model averaging. Prerequisite: either STAT 342, STAT/MATH 390, STAT 421, STAT/ECON 481, or SOC 425; recommended: MATH 308. Offered: jointly with CS&SS 504.

STAT 506 Applied Probability and Statistics (4) Discrete and continuous random variables, independence and conditional probability, central limit theorem, elementary statistical estimation and inference, linear regression. Emphasis on physical applications. Prerequisite: some advanced calculus and linear algebra. Offered: jointly with AMATH 506.

STAT 512 Statistical Inference (4) Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory. Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 395 and STAT 421, STAT 423, STAT 504, or BIOST 512 (concurrent registration permitted for these three). Offered: A.

STAT 513 Statistical Inference (4) Review of random variables; transformations, conditional expectation, moment generating functions, convergence, limit theorems, estimation; Cramer-Rao lower bound, maximum likelihood estimation, sufficiency, ancillarity, completeness. Rao-Blackwell theorem. Hypothesis testing: Neyman-Pearson lemma, monotone likelihood ratio, likelihood-ratio tests, large-sample theory.

Contingency tables, confidence intervals, invariance. Introduction to decision theory. Prerequisite: STAT 512. Offered: W.

STAT 516 Stochastic Modeling of Scientific Data (-4) Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 511 or STAT 396. Offered: A.

STAT 517 Stochastic Modeling of Scientific Data (-4) Markovian and semi-Markovian models, point processes, cluster models, queuing models, likelihood methods, estimating equations. Prerequisite: STAT 516. Offered: W.

STAT 518 Stochastic Modeling Project (4) Supervised, applied project based on stochastic modeling of scientific data. Prerequisite: STAT 517. Offered: Sp.

STAT 519 Time Series Analysis (3) Descriptive techniques. Stationary and nonstationary processes, including ARIMA processes. Estimation of process mean and autocovariance function. Fitting ARIMA models to data. Statistical tests for white noise. Forecasting. State space models and the Kalman filter. Robust time series analysis. Regression analysis with correlated errors. Statistical properties of long memory processes. Prerequisite: STAT 513. Offered: A.

STAT 520 Spectral Analysis of Time Series (4) Estimation of spectral densities for single and multiple time series. Nonparametric estimation of spectral density, cross-spectral density, and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, or IND E 315. Offered: jointly with E E 520; W.

STAT 521 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 521; A.

STAT 522 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 522; W.

STAT 523 Advanced Probability (3) Measure theory and integration, independence, laws of large numbers. Fourier analysis of distributions, central limit problem and infinitely divisible laws, conditional expectations, martingales. Prerequisite: either MATH 426 or MATH 576. Offered: jointly with MATH 523; Sp.

STAT 524 Design of Medical Studies (3) Emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for students in biostatistics and

other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of STAT 421, STAT 423, BIOST 513, BIOST 518, or EPI 512; or permission of instructor. Offered: jointly with BIOST 524; even years.

STAT 529 Sample Survey Techniques (3) Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent; or permission of instructor. Offered: jointly with BIOST 529/CS&SS 529.

STAT 530 Wavelets: Data Analysis, Algorithms, and Theory (3) Review of spectral analysis. Theory of continuous and discrete wavelets. Multiresolution analysis. Computation of discrete wavelet transform. Time-scale analysis. Wavelet packets. Statistical properties of wavelet signal extraction and smoothers. Estimation of wavelet variance. Prerequisite: some Fourier theory and linear algebra; Math or STAT 390, ECON or STAT 481, or STAT 513; or IND E 315. Offered: jointly with E E 24; Sp.

STAT 533 Classical Theory of Linear Models (3) Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: STAT 421 or STAT 423; and STAT 513, BIOST 515, and a course in matrix algebra. Offered: jointly with BIOST 533; Sp.

STAT 534 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 534; Sp.

STAT 535 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 535; A.

STAT 538 Statistical Computing (3) Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with BIOST 538; W.

STAT 536 Log-Linear Modeling and Logistic Regression for the Social Sciences (3) Log-linear modeling of multidimensional contingency tables. Logistic regression. Applications to social mobility, educational opportunity, and assortative marriage. Applied and computing focus.

Prerequisite: SOC 424, SOC 425, SOC 426, or equivalent; recommended: CS&SS 505 and CS&SS 506, or equivalent. Offered: jointly with SOC 536/CS&SS 536.

STAT 542 Multivariate Analysis (3) Multivariate normal distribution; partial and multiple correlation; Hotelling's T^2 ; Bartlett's decomposition; various likelihood ratio tests; discriminant analysis; principal components; graphical Markov models. Prerequisite: STAT 582 or permission of instructor. Offered: alternate years.

STAT 544 Bayesian Statistical Methods (3) Statistical methods based on the idea of a probability distribution over the parameter space. Coherence and utility. Subjective probability. Likelihood principle. Conjugate families. Structure of Bayesian inference. Limit theory for posterior distributions. Sequential experiments. Exchangeability. Bayesian nonparametrics. Empirical Bayes methods. Prerequisite: STAT 513 or permission of instructor. Offered: alternate years.

STAT 547 Derivatives: Theory, Statistics, and Computing (4) Covers theory, computation, and statistics of options and derivatives pricing, including options on stocks, stock indices, futures, currencies, and interest rate derivatives. Prerequisite: STAT 506 or equivalent, or permission of instructor. Recommended: ECON 424.

STAT 549 Statistical Methods for Portfolios (4) Covers the fundamentals of modern statistical portfolio construction and risk measurement, including theoretical foundations, statistical methodology, and computational methods using modern object-oriented software for data analysis, statistical modeling, and numerical portfolio optimization. Prerequisite: ECON 424 or equivalent, or permission of instructor.

STAT 550 Statistical Genetics I: Mendelian Traits (3) *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power; latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with BIOST 550; A.

STAT 551 Statistical Genetics II: Quantitative Traits (3) *Monks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BIOST 515; or permission of instructor. Offered: jointly with BIOST 551; W.

STAT 552 Statistical Genetics III: Design and Analysis (3) *Wijsman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with BIOST 552; Sp.

STAT 561 Special Topics in Applied Statistics (1-5, max. 15) Data analysis, spectral analysis or robust estimation. Prerequisite: permission of instructor.

STAT 562 Special Topics in Applied Statistics (1-5, max. 15) Data analysis, spectral analysis or robust estimation. Prerequisite: permission of instructor.

STAT 563 Special Topics in Applied Statistics (1-5, max. 15) Data analysis, spectral analysis or robust estimation. Prerequisite: permission of instructor.

STAT 570 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 513; STAT 533 or STAT 421 and STAT 423, and a course in matrix algebra for STAT 570. Offered: jointly with BIOST 570; A.

STAT 571 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 570. Offered: jointly with BIOST 571; W.

STAT 572 Advanced Applied Statistics and Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 571. Offered: jointly with BIOST 572; Sp.

STAT 573 Statistical Methods for Categorical Data (3) Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasilielihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: STAT 571 and STAT 582. Offered: jointly with BIOST 573; alternate years.

STAT 574 Multivariate Statistical Methods (3) Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: STAT 570 or permission of instructor. Offered: jointly with BIOST 574; alternate years.

STAT 576 Statistical Methods for Survival Data (3) Statistical methods for censored survival data. Covers parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either STAT 423, BIOST 515, or Q SCI 483, or equivalent. Offered: jointly with BIOST 576; alternate years.

STAT 577 Advanced Design and Analysis of Experiments (3) Concepts important in experimental design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Graeco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response

surface experiments. Prerequisite: STAT 570 or STAT 421 (minimum grade 3.0), or permission of instructor. Offered: jointly with BIOST 577.

STAT 578 Special Topics in Advanced Biostatistics (*, max. 3) Advanced-level topics in biostatistics offered by regular and visiting faculty members. Prerequisite: permission of instructor. Offered: jointly with BIOST 578.

STAT 579 Data Analysis and Reporting (2) Analysis of real data to answer scientific questions. Common data-analytic problems. Sensible approaches to complex data. Graphical and tabular presentation of results. Writing reports for scientific journals, research collaborators, consulting clients. Graduate standing in statistics or biostatistics or permission of instructor. Offered: jointly with BIOST 579; AWSp.

STAT 581 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 513; either MATH 426 or MATH 576. Offered: A.

STAT 582 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 581. Offered: W.

STAT 583 Advanced Theory of Statistical Inference (3) Limit theorems, asymptotic methods, asymptotic efficiency and efficiency bounds for estimation, maximum likelihood estimation, Bayes methods, asymptotics via derivatives of functionals, sample-based estimates of variability: (bootstrap and jackknife); robustness; estimation for dependent data, nonparametric estimation and testing. Prerequisite: STAT 582. Offered: Sp.

STAT 586 Martingales: Survival Analysis (3) Theory of counting processes and martingales to provide unified study of survival analysis methods. Focus on survival distribution estimators, censored data rank statistics, regression methods with censored survival data. Development of small samples moments, asymptotic distributions, and efficiencies. Prerequisite: STAT 521 or STAT 583 or permission of instructor; recommended: STAT 576. Offered: jointly with BIOST 586; W.

STAT 590 Statistics Seminar (*, max. 15) Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSp.

STAT 591 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: A.

STAT 592 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and

decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: W.

STAT 593 Special Topics in Statistics (1-5, max. 15) Distribution-free inference, game and decision theory, advanced theory of estimation (including sequential estimation), robustness, advanced probability theory, stochastic processes or empirical processes. Prerequisite: permission of instructor. Offered: Sp.

STAT 598 Techniques of Statistical Consulting (1) Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with BIOST 598; ASp.

STAT 599 Statistical Consulting (*, max. 12) Consulting experience in data analysis, applied statistics. Student required to provide consulting services to students and faculty three hours per week. Credit/no credit only. Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 600 Independent Study or Research (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 700 Master's Thesis (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

STAT 800 Doctoral Dissertation (*) Prerequisite: permission of graduate program coordinator. Offered: AWSpS.

Women Studies

WOMEN 200 Introduction to Women Studies (5) I&S Feminist analysis of the construction and enforcement of gender differences and gender inequalities in various contexts. Emphasis on the intersection of race, class, sexuality, and nationality in the lives of women. Topics include feminist theory, motherhood, popular culture, sexual autonomy, racism, and activism in the United States, Asia, Latin America. Offered: AWSpS.

WOMEN 206 Philosophy of Feminism (5) I&S Philosophical analysis of the concepts and assumptions central to feminism. Theoretical positions within the feminist movement; view of the ideal society, goals and strategies of the movement, intersections of the sex-gender system with other systems of oppression. Offered: jointly with PHIL 206/POL S 212.

WOMEN 207 Introduction to Feminist Theories (5) I&S Introduction to the multiplicity of feminist theories in both the United States and transnational contexts; examination of the histories of different theoretical positions and their relationship to feminist praxis. Topics include feminist analysis of knowledge production, power, and the categories of gender, race, class, sexualities, ethnicity, and nation.

WOMEN 257 Psychology of Gender (5) I&S Kenney Major psychological theories of gender-role development; biological and environmental

influences that determine and maintain gender differences in behavior; roles in children and adults; topics include aggression, cognitive abilities, achievement motivation, affiliation. Recommended: either PSYCH 101, PSYCH 102, or WOMEN 200. Offered: jointly with PSYCH 257.

WOMEN 283 Introduction to Women's History (5) I&S Includes units on American, European, and Third World women that examine centers of women's activities, women's place in male-dominated spheres (politics), women's impact on culture (health, arts), and the effect of larger changes on women's lives (technology, colonization). Offered: jointly with HIST 283; A.

WOMEN 290 Special Topics in Women Studies (2-5, max. 15) I&S Exploration of specific problems and issues relevant to the study of women. Offered by visiting or resident faculty members.

WOMEN 299 Women Studies Community in Colloquia (2) I&S Introduces new majors to the field of women studies. Includes helping students develop a course of study for their major, meeting their departmental advisor and the faculty. Students are encouraged to take this course immediately upon declaring the major. May be linked to service learning.

WOMEN 302 Research Methods in Women Studies (5) I&S *Jacobs* Explores appropriate research methodologies for interdisciplinary work in women studies. Examines current debates and issues in feminist methodologies and critiques of methodology. Use of historical documents and theoretical texts. Computer applications in research in women studies. Prerequisite: either WOMEN 200 or WOMEN 206.

WOMEN 305 Feminism in an International Context (5) I&S *Ramamurthy, Sunindyo* Women and feminism from global theoretical perspectives. Critical theoretical ways of thinking about feminism. How women are differently situated throughout the world. How they are represented affects women's agency. Focus on how race and gender affect one another. Representations of and by women throughout the world.

WOMEN 310 Women and the Law (5) I&S Examines how law addresses women, how the courts have made attempts to address women of color, poor women, lesbians, and women with disabilities. Topics include constitutional construction of equality, employment discrimination, reproductive rights, regulation of sexuality, families and motherhood, sexual harassment, violence against women and international women and human rights.

WOMEN 313 Women in Politics (5) I&S *DiStefano* Theoretical, historical, and empirical studies of women's participation in political and social movements. Women's diverse efforts to improve their political, social, and economic status. Policy issues of particular concern to women. Women's political experiences in household, local, regional, national, and international arenas Offered: jointly with POL S 313.

WOMEN 321 History of Afro-American Women and the Feminist Movement (5) I&S "Feminist Movement" from early nineteenth century to present. Treats relationship between Black and White women in their struggle for independence, at times together and at times apart. Discusses the reasons, process, and results of collaboration

as well as opposition. Examines recent and contemporary attempts at cooperation. Offered: joint with AFRAM 321.

WOMEN 322 Race, Class, and Gender (5) I&S *Ramamurthy, Sunindyo* The intersection of race, class, and gender in the lives of women of color in the United States from historical and contemporary perspectives. Topics include racism, classism, sexism, activism, sexuality, and inter-racial dynamics between women of color groups. Offered: jointly with AES 322.

WOMEN 323 History of Racial Formation in the United States: 1800-1990 (5) I&S *Yee* Traces the development of the concept of race in the United States from the nineteenth century to the late twentieth century. Specific topics include paid and unpaid labor, media, reproduction, migration, social activism, and the processes of identity and community formation.

WOMEN 333 Gender and Globalization: Theory and Process (5) I&S *Ramamurthy* Theoretical, historical, and empirical analysis of how current processes of globalization are transforming the actual conditions of women's lives, labor, gender ideologies, and politics in complex and contradictory ways. Topics include feminist exploration of colonialism, capitalism, economic restructuring policies, resistance in consumer and environmental movements. Offered: jointly with SIS 333.

WOMEN 339 Social Movements in Contemporary India (5) I&S *Ramamurthy, Sivaramakrishnan* Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with ANTH 339/ SISA 339.

WOMEN 341 Native Women in the Americas (5) I&S Historiography, sociology, biography, autobiography, and fiction about native women in the United States and Canada. Offered: jointly with AIS 341; AWSpS.

WOMEN 345 Women and International Economic Development (5) I&S *Ramamurthy* Questions how women are affected by economic development in Third World and celebrates redefinitions of what development means. Theoretical perspectives and methods to interrogate gender and development policies introduced. Current processes of globalization and potential for changing gender and economic inequalities assessed. Offered: jointly with ANTH 345/SIS 345.

WOMEN 350 Women in Law and Literature (5) I&S/VLPA *Tupper* Representations of women in American law and literature. Considers how women's political status and social roles have influenced legal and literary accounts of their behavior. Examines how legal cases and issues involving women are represented in literary texts and also how law can influence literary expression. Offered: jointly with CHID 350.

WOMEN 351 Women of Color as Cross-Cultural Artists (5) I&S/VLPA *Habell-Pallan* Provides a historical context for artistic forms produced by racialized women. Examines the cultural production of Chicanas and Latinas in relation to that Native American, African American, East and South Asian American, and Arab American women as well as those women

of mixed heritage in the U.S. Offered: jointly with AES 310.

WOMEN 353 Anthropological Studies of Women (5) I&S *Jacobs* Critical examination of the intersections between anthropology, research on gender issues, and feminism. Readings and class discussions examine the ways women have been represented in the field of anthropology and the repercussions of these anthropological images of women on contemporary understandings of gender. Offered: jointly with ANTH 353; W.

WOMEN 355 Men and Masculinity (5) I&S *Clatterbaugh* Critical study of systematic responses of men to feminist movements, including conservative, pro-feminist, men's rights, mythopoetic, and religious responses. How men of color and gay men view these various men's movements and their issues. Special attention given to philosophical problems such as nature of oppression, human nature, justice, and masculinity. Recommended: WOMEN 200.

WOMEN 357 Psychobiology of Women (5) NW *Kenney* Physiological and psychological aspects of women's lives: determinants of biological sex; physiological and psychological events of puberty, menstruation, and menopause; sexuality; pregnancy, childbirth; the role of culture in determining the psychological response to the physiological events. Recommended: PSYCH/WOMEN 257. Offered: jointly with PSYCH 357.

WOMEN 383 Social History of American Women to 1890 (5) I&S *Yee* A multi-racial, multicultural study of women in the United States from the 17th century to 1890 emphasizing women's unpaid work, participation in the paid labor force, charitable and reform activities, and 19th century social movements. Uses primary materials such as diaries, letters, speeches, and artifacts. Offered: jointly with HSTAA 373; W.

WOMEN 384 Social History of American Women in the 20th Century (5) I&S Analyzes major themes in the history of women in North America from 1890 through the 1990s. Themes include family and community formation, social activism, education, paid and unpaid labor patterns, war, migration, and changing conceptions of womanhood and femininity in the 20th century. Offered: jointly with HSTAA 374.

WOMEN 392 Asian-American Women (5) I&S *Root* History of and contemporary issues related to Asian-American women in the United States. Recommended: AAS 205 or AAS 206. Offered: jointly with AAS 392.

WOMEN 404 Critical Pedagogies of Social Change (5) I&S Examines theories of critical pedagogy as developed in struggles against race, class, and gender oppression in the U.S. and transnationally. Topics include the relation between theory and practice, the position of educators in struggles for social change, and the role of the arts in movement-building. Offered: jointly with AES 404.

WOMEN 405 Comparative Women's Movements and Activism (5) I&S *Sunindyo* Comparative cultural, national, and historical study of women's movements and activism. Critically analyzes multiple arenas of women's movements and resistance. Topics include feminist anti-racism, pre-nationalism and nationalism, economics, electoral politics, women's and human rights, and international/

transnational feminisms. Prerequisite: either WOMEN 205, WOMEN 305, or SOC 364.

WOMEN 410 Feminist Legal Studies: Theory and Practice (5) I&S Examines feminist theoretical analyses of the law. Engages in current debate on the study of critical race, gender, and class theory. Includes: women in prison, public assistance, the sex industry, women and health care, and immigration law. Recommended: WOMEN 200 or WOMEN 310. Offered: jointly with LSJ 466/POL S 466.

WOMEN 415 Gender and Education (5) I&S Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with EDC&I 440; S.

WOMEN 417 The Politics of Talent Development (5) I&S Investigation of the psychological, cultural, socioeconomic, and political factors that enhance or inhibit the development of exceptional ability, focusing principally, but not exclusively, on women and girls. Pays special attention to issues of race, class, gender, geography, and an individual's orientation to the mainstream of her culture.

WOMEN 423 Feminism, the State, and Democracy in Indonesia (5) I&S Questions how women's issues and interests are affected by the history of Indonesia and by changes in the global political economy. Celebrates ways in which Indonesian women, feminists, and feminists negotiate their subject positions. Analyzes issues of gender and human rights in national political arenas, and of democratic reform. Offered: AWPSP.

WOMEN 424 Women in Midlife (5) I&S Explores women's lives, experiences, and concerns in the middle years. Topics include physical and physiological changes; psychological development; representations and treatment of midlife women in literature, media, and other institutions; economics of aging; crosscultural and subcultural differences in the aging process; the synergistic effects of sexism and ageism on women.

WOMEN 425 Femininity, Feminism, and Antifeminism in Popular Culture (5) I&S/VLPA *Twine* Explores shifting meanings and reconfigurations of femininity, feminism, and antifeminism in United States popular culture. Analyzes the incorporation and transformation of feminist critiques of dominant ideologies into popular culture. Popular forms examined may include television serials, music videos, advertisements, films, and novels. Prerequisite: WOMEN 200.

WOMEN 427 Women and Violence (5) I&S *Ginorio* Multi-disciplinary explorations of the continuum of violence which affects women's lives, ranging from experience in personal settings (family violence) to cultural or state policies (prisons, wars). Violence against women explored in the context of societal, political, and state violence. Recommended: WOMEN 200.

WOMEN 429 Scandinavian Women Writers in English Translation (5) VLPA *Gavel-Adams* Selected works by major Scandinavian women

writers from mid-nineteenth-century bourgeois realism to the present with focus on feminist issues in literary criticism. Offered: jointly with SCAND 427.

WOMEN 435 Gender and Spirituality (5) I&S Exploration of ways in which gender informs spiritual teachings and practices of different groups in ancient and contemporary times, with particular attention to the relationship between spiritual beliefs and the construction of social, psychological, and political realities.

WOMEN 438 Jewish Women in Contemporary America (5) I&S Examines how Jewish women's identities are socially constructed and transformed in contemporary America, using social histories, memoirs, and ethnographies to analyze scholars' approaches to Jewish women's lives. Topics include the role of social class, religion, migration, the Holocaust, and race relations in Jewish women's lives. Offered: jointly with SISJE 438.

WOMEN 440 Reading Native American Women's Lives (5) I&S *Jacobs, Ross* Seminar based on social science writings, autobiographies, biographies, and fiction written by, with, or about indigenous women of the United States and Canada. Offered: jointly with AIS 440.

WOMEN 442 Images of Natives in the Cinema and Popular Cultures (5) I&S/VLPA *Ross* Cultural examination of images of native people in cinema and popular culture based on social science writings and films by or about natives in the United States and Canada. Offered: jointly with AIS 442.

WOMEN 447 Economics of Gender (5) I&S *Rose* Microeconomic analysis of the sources of gender differences in earnings, labor force participation, occupational choice, education, and consumption. Economic theories of discrimination, human capital, fertility and intrahousehold resource allocation. Economics of the family in developed and developing countries. Prerequisite: 2.0 ECON 300. Offered: jointly with ECON 447.

WOMEN 450 Language and Gender (5) I&S, VLPA *Bilaniuk* Survey of the theoretical trends, methods, and research findings on the relationship between language and gender. Focus on power relations in gendered language use. Extensive study of research based on conversational analysis. Prerequisite: LING 200; either LING 201, LING 203, or ANTH 203. Offered: jointly with ANTH 450/LING 458.

WOMEN 451 Latina Cultural Production (5) I&S/VLPA Explores the expressive culture of Chicana/Mexican American/Latina women in the United States. Cultural and artistic practices in home and in literary, music, film, spoken word, performing and visual arts. Focuses on how Chicana/Latina writers and artists re-envision traditional iconography. Offered: jointly with CHSTU 410.

WOMEN 453 Lesbian Lives and Culture (5) I&S An exploration and overview of lesbianism in historical, social, cultural, and interpersonal contexts. Prerequisite: either WOMEN 200 or WOMEN 206.

WOMEN 454 Women, Words, Music, and Change (5) I&S/VLPA *Jacobs* Comparative analysis of use of myths, tales, music, and other forms of expressive culture to account for, reinforce, and change women's status and roles.

Recommended: WOMEN 353. Offered: jointly with ANTH 454.

WOMEN 455 Contemporary Feminist Theory (5) I&S *Barlow* Raises the question of how political contexts condition the way some ideas become theory. Emphasizes the present crises in thinking about a transnational feminism.

WOMEN 456 Feminism, Racism, and Anti-Racism (5) I&S Examines meaning of racism and feminism in women's lives in an international context. Building upon an analysis of racial hierarchies and institutionalized racism, explores strategies used by women engaged in feminist and anti-racist activism. Prerequisite: WOMEN 200.

WOMEN 457 Women in China to 1800 (5) I&S *Ebrey* Gender in Chinese culture, women's situations in the patrilineal family system, and the ways women's situations changed as other dimensions of China's political system, economy, and culture changed from early times through the nineteenth century. Offered: jointly with HSTAS 457.

WOMEN 458 Ideologies and Technologies of Motherhood (5) I&S Examines how motherhood is culturally constituted, regulated, and managed within various ideological and technological milieus. Uses ethnographies from anthropology and case studies from feminist legal theory. Topics include slave mothers, surrogate mothers, lesbian mothers, transracial mothers, co-mothers, teen mothers. Prerequisite: WOMEN 200. Offered: jointly with ANTH 484.

WOMEN 459 Gender Histories of Modern China, 18th to 20th Centuries (5) I&S *Barlow* Emergence of modernist social, political, intellectual gender formations in social activism, revolutionary writing, scientific ideologies, economic globalization. Stresses gender difference in colonial modernity, revolutionary movement, communism, post-socialist market society. Relates modern Chinese women to global flows, new division of labor, local and regional experience. Offered: jointly with HSTAS 459.

WOMEN 462 Isak Dinesen and Karen Blixen (5) VLPA *Stecher-Hansen* The fiction of Isak Dinesen (pseudonym for Karen Blixen) reevaluated in light of current issues in literary criticism, particularly feminist criticism. Close readings of selected tales, essays, and criticism. Offered: jointly with SCAND 462.

WOMEN 468 Latin American Women (5) I&S/VLPA *Steele* The elaboration of discourses of identity in relation to gender, ethnicity, social class, and nationality, by women writers from South America, Mexico, Central America, and the Caribbean. Testimonial literature, literature and resistance, women's experimental fiction. Prerequisite: either SPAN 303 or SPAN 316; SPAN 321; one additional 300-level course above SPAN 303. Offered: jointly with SPAN 468.

WOMEN 476 Women and the City (5) I&S *England* Explores the reciprocal relations between gender relations, the layout of cities, and the activities of urban residents. Topics include feminist theory and geography (women, gender, and the organization of space); women and urban poverty, housing and homelessness; gender roles and labor patterns; geographies of childcare; and women and urban politics. Offered: jointly with GEOG 476.

WOMEN 483 Topics in U.S. Women's History (5, max. 10) I&S Yee Selected topics in United States women's history from the nineteenth and twentieth centuries. Prerequisite: either WOMEN 200, WOMEN 283, or WOMEN 383.

WOMEN 485 Issues for Ethnic Minorities and Women In Science and Engineering (3/5) I&S Addresses issues faced by women and ethnic minorities in physical sciences and engineering. Focuses on participation, barriers to participation, and solutions to those issues for women and ethnic minorities in physical sciences and engineering. Offered: jointly with PHYS 451.

WOMEN 488 Women and/in Science (5) I&S Ginorio Explores science as a method of inquiry and as a profession while also expanding knowledge about women through the use of biographies of women scientists, discipline-based and feminist critiques, and the psycho-social concept of socially defined identities. Recommended: one Women Studies course and one college-level science course.

WOMEN 489 Ethnicity, Gender, and Media (5) I&S Baldasty Media portrayal of women and people of color; creation of alternative media systems by women and people of color in the United States. Offered: jointly with COM 489/AES 489.

WOMEN 490 Special Topics in Women Studies (2-5, max. 15) I&S Exploration of specific problems and issues relevant to the study of women. Offered by visiting or resident faculty members. Primarily for upper-division and graduate students.

WOMEN 494 Women Studies Capstone (5) I&S Provides graduating seniors with the opportunity to demonstrate facility with writing, critical thinking, documentation of scholarly work, research/gathering of information, and the ability to disseminate ideas to intended audiences via the creation of a capstone project. Offered: AWSpS.

WOMEN 495 Tutoring Women Studies (5) Students train to serve as tutors in designated courses. Facilitate weekly group discussions, assist with writing assignments, explain course materials. Credit/no credit only.

WOMEN 496 Global Feminisms: Women Studies International and Indigenous (3-5, max. 10) Participation in academic programs related to Women Studies emphasizing globalization and study in international contexts or indigenous communities within the United States. Credit/no credit only. Prerequisite: WOMEN 200.

WOMEN 497 Fieldwork in Women Studies (1-15, max. 15) Internships in local agencies. Allows development of specific skills in area of specialization. Credit/no credit only. Offered: AWSpS.

WOMEN 499 Undergraduate Research (1-5, max. 10) Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWSpS.

WOMEN 501 History of Feminism (5) Barlow, Yee Study of feminism from the 18th through the 20th centuries in the national, international, and intranational world system, with a focus on imperialism, colonialism, nationalism, and modernity. Surveys the literature in a global context, supplemented by critical essays and historiographic reviews.

WOMEN 502 Cross Disciplinary Feminist Theory (5) Barlow Raises questions about how feminism becomes theory and what the relation of feminist theory is to conventional disciplines. Readings exemplify current crises in feminism (e.g., the emergence of neo-materialism; critical race theory; citizenship; identity; transnational and migrancy and questions of post-colonialism) to consider disciplinization.

WOMEN 503 Feminist Research and Methods of Inquiry (5) Allen Explores appropriate research methodologies for interdisciplinary work. Asks how scholarship is related to feminism as a social movement and to the institutions in which we work. Focuses on how similar objects of study are constituted in different disciplines for feminist scholars. Offered: Sp.

WOMEN 504 Philosophies and Techniques of Teaching (5) Acquaints students with professional and educational issues of college teaching. Students design a course, including a daily outline, reading materials, evaluation instruments, course activities, assessment plans. Includes weekly teaching exercises as well as videotaping an actual class. Prerequisite: experience as a TA or equivalent. Priority given to Women Studies graduate students.

WOMEN 505 Feminist Publishing (5) Howard Seminar on feminist academic publishing. Students revise a scholarly paper in preparation for submission to an academic journal and provide critical commentary on other students' scholarly work. Also addresses general and specific issues related to the profession of academic publishing.

WOMEN 512 Critical and Interdisciplinary Approaches to Women's Health (3) Ensign, Schroeder Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with NURS 512; W.

WOMEN 513 Seminar in Contemporary Women's Health Issues (1-5, max. 12) Critical analysis of contemporary and historical literature relevant to health care for women across the life span. Synthesis of a holistic view of women's health to guide research and practice. Offered: jointly with NURS 513.

WOMEN 534 Feminism and History of Women in China (5) Explores historical question of gendered subjects in modern China and feminist stories of emancipation of Chinese women asking how these render invisible other kinds of history. Prerequisite: background in China studies or ability to handle Chinese primary sources.

WOMEN 539 Social Movements in Contemporary India (5) Ramamurthy, Sivaramkrishnan Covers issues of social change, economic development, and identity politics in contemporary India studied through environmental and women's movements. Includes critiques of development and conflicts over forests, dams, women's rights, religious community, ethnicity, and citizenship. Offered: jointly with SISSA 539/ ANTH 539.

WOMEN 546 Gender and Colonialism in Eastern Asia (5) d Economic-political colonialization, post colonialism, and statist-gendered citizenship; intra-Asian subimperialism

structuring domestic production, family, and gendered subjectivities; humanism and the New Woman; modern contests over new masculinity and new femininity; and the effect of war, imperialist occupation and colonial modernity on interregional flows of ideas, labor, capital, and jurisprudence. Offered: jointly with HSTAS 546; AWSpS.

WOMEN 547 Gender and the New International Division of Labor in Asia Pacific (5) Shift of the dynamic relation of gender, state, and citizens from modernization (national development) to globalization (intra-regional development) strategies in Pacific Asia, 1945 to present. Consumption, service provision, migratory labor, intra-Asian investment, localization. Offered: jointly with HSTAS 547.

WOMEN 553 Discourses in Feminist Anthropology Seminar (5) Jacobs Exploration of feminist anthropological theories and the works of their critics. Ways of using feminist anthropology in preparation for and conducting fieldwork. Topics include foundations in feminist anthropology, grand theories, variation in feminist theoretical foci within the "four fields," responses to critics. Prerequisite: graduate standing. Offered: jointly with ANTH 555; W.

WOMEN 566 Discourse and Sex/uality (5) Seminar-based analysis of discourse and social construction of eroticism/desire in face-to-face/mediatized talk and texts; examination of the reproduction of power, control and ideology through the linguistic and semiotic realization of sex/uality. Offered: jointly with COM 566.

WOMEN 589 Gender, Race, and Communication (5) Analysis of the role of media in the construction of reality, production processes, and their influence on media representation of women and people of color. Offered: jointly with COM 567.

WOMEN 590 Special Topics (1-5, max. 15) Offered by visitors or resident faculty as a one-time in-depth study of special interest.

WOMEN 596 Preceptorial for Women Studies Graduate Students (5, max. 15) Graduate student and faculty member work collaboratively in developing or revising course content and pedagogical approach on a specialized area.

WOMEN 597 Fieldwork in Women Studies (2-5, max. 15) Supervised ethnographic and other on-site research by women studies graduate students. Women Studies graduate students only.

WOMEN 598 Directed Readings in Women Studies (*, max. 35) Selected topics for individualized or small group study.

WOMEN 600 Independent Study or Research (*) Offered: AWSpS.

WOMEN 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

WOMEN 701 Master's Practicum (*) Offered: AWSpS.

WOMEN 800 Doctoral Dissertation (*)

School of Business Administration

Accounting

ACCTG 199 Accounting for Problem Solving (2, max. 4) Supplementary lectures, discussions, and problem solving sessions in introductory accounting. Enrollment priority to EOP students and others by permission. Credit may not be applied to fulfill specific program requirements. Credit/no credit only. Corequisite: ACCTG 215.

ACCTG 215 Introduction to Accounting and Financial Reporting (5) Nature and social setting of accounting; uses of accounting information; introduction of basic accounting concepts and procedures; interpretation of financial statements. May not be repeated.

ACCTG 225 Fundamentals of Managerial Accounting (5) Analyses and evaluation of accounting information as part of the managerial process of planning, decision making, and control. Concentrates on information useful to enterprise managers. Prerequisite: either ACCTG 210, ACCTG 220, or ACCTG 215; ECON 200; may not be repeated.

ACCTG 301 Intermediate Accounting I (3) Concepts and principles of financial accounting. Analysis of controversies and problems related to the measurement of enterprise income and asset and liability valuation. Prerequisite: 2.0 in ACCTG 225; may not be repeated.

ACCTG 302 Intermediate Accounting II (3) Concepts and principles of financial accounting. Analysis of controversies and problems related to the measurement of enterprise income and asset and liability valuation. Prerequisite: 2.0 in ACCTG 301; may not be repeated.

ACCTG 303 Intermediate Accounting III (3) Concepts and principles of financial accounting. Analysis of controversies and problems related to the measurement of enterprise income and asset and liability valuation. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 311 Cost Accounting (3) Introduction to the theory of cost accounting; job order, process, and standard cost systems; overhead accounting; problems in accumulation and allocation of costs; decision making with cost data. Prerequisite: 2.0 in ACCTG 301; may not be repeated.

ACCTG 320 Introduction to Accounting Information Systems (3) Concepts of accounting information systems in organizations. Processes of analyzing and designing accounting information systems, with emphasis on those using computer facilities. Internal controls and auditing considerations. Prerequisite: 2.0 in ACCTG 225; I S 300 which may be taken concurrently; may not be repeated.

ACCTG 330 Introduction to Accounting Information Systems (3) Concepts of accounting information systems in organizations. Processes of analyzing and designing accounting information systems, with emphasis on those using computer facilities. Internal controls and auditing considerations. Prerequisite: 2.0 in ACCTG 302; 2.0 in I S 300; may not be repeated.

ACCTG 375 Topics in Financial Reporting (4) Critical examination of the uses and limitations of general purpose financial statements that have been prepared in accordance with generally

accepted accounting principles. Not open for credit to accounting majors or to students who have completed 301. Prerequisite: either 2.0 in ACCTG 225 or 2.0 in ACCTG 230; may not be repeated.

ACCTG 401 Federal Income Tax Factors in Business Decisions (3) Service course in taxation recommended for the junior year for non-accounting majors. May also be taken by MBA students for graduate credit. Not open to accounting majors. Prerequisite: either 2.0 in ACCTG 225 or 2.0 in ACCTG 230; may not be repeated.

ACCTG 411 Auditing Standards and Principles (3) Intensive introduction to the attest function in society today. The environment, the process, and the report of the public auditor are analyzed. Potential extensions of the attest function are examined. Prerequisite: 2.0 in ACCTG 302; 2.0 in ACCTG 311; 2.0 in either ACCTG 320 or ACCTG 330; may not be repeated.

ACCTG 420 Database Management for Accounting (3) Continuation of ACCTG 320, covering database and processing architectures, database reliability, database recovery, database security, database administration, internets and intranets, and network security. Not available for credit to information systems majors or to students who have completed I S 410 and 445. Prerequisite: 2.0 in ACCTG 320; may not be repeated.

ACCTG 421 Tax Effects of Business Decisions (3) Issues in taxation, including tax considerations in business decision making, tax effects of business transactions, taxation of compensation, fringe benefits, capital gains, fixed asset transactions, disposition of business distribution from corporations. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 440 Accounting and Financial Management Decisions (3) Business financial planning with an emphasis of the role of accounting information in financial decisions. Topics include the accounting and finance aspects of business valuation, short and long term financing, short and long term investments, alternative types of debt and equity financing, and related topics. Prerequisite: 2.0 in ACCTG 302; 2.0 in ACCTG 311; FIN 350; may not be repeated.

ACCTG 450 Business Taxation (3) Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Includes corporate distributions, liquidations, and reorganizations. Prerequisite: 2.0 in ACCTG 421; may not be repeated.

ACCTG 451 Individual Income Taxation (3) Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual income tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees. Prerequisite: 2.0 in ACCTG 421; may not be repeated.

ACCTG 460 Advanced Cost Accounting (3) Advanced analysis of cost and management accounting problems; special applications of cost accounting techniques for management planning

and control; current developments in cost accounting. Prerequisite: 2.0 in ACCTG 311; may not be repeated.

ACCTG 470 Strategic Overview of Accounting (3) Provides a strategic overview of accounting functions in industry, government, and public accounting. Includes comprehensive exam covering all required courses in the accounting major. Prerequisite: ACCTG 321; ACCTG 421 which may be taken concurrently; ACCTG 440 which may be taken concurrently; may not be repeated.

ACCTG 471 Internal Auditing (3) Independent appraisal function established within an organization. Role and nature of internal auditing; intensive review of internal control; management effectiveness audits; and financial audits from the point of view of the internal auditor. Prerequisite: 2.0 in ACCTG 411; may not be repeated.

ACCTG 480 Accounting for Not-for-Profit Organizations (3) Fund and budgetary accounting as applied to public sector organizations, such as governments, foundations, hospitals, and colleges. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 485 Advanced Financial Accounting (3) Accounting for partnerships, accounting for business combinations, parent-subsidiary and branch relationships, foreign exchange. Prerequisite: 2.0 in ACCTG 302; may not be repeated.

ACCTG 490 Special Topics in Accounting (1-6, max. 6) Special topics of current concern to faculty and students. Offered only when faculty is available and student interest is sufficient. Class is announced in advance of scheduled offerings.

ACCTG 495 Accounting Internship (1-4, max. 8) One quarter's internship with a certified public accounting firm, industrial organization, or government agency. Credit/no credit only. Prerequisite: ACCTG 301.

ACCTG 499 Undergraduate Research (1-6, max. 9) Arranged and supervised by individual members of the faculty.

ACCTG 500 Financial Accounting (4) Introduction to concepts and procedures underlying determination and presentation of information for financial decisions by investors and other decision makers outside the business enterprise. Study of problems of valuation, income determination, and financial reporting.

ACCTG 501 Managerial Accounting (4) Study of the generation and the use of accounting information within the firm for purposes of planning and controlling operations. Topics covered include cost concepts, responsibility accounting systems, cost control, and the use of accounting information in short- and long-term management decision problems. Prerequisite: ACCTG 500.

ACCTG 503 Introduction to Accounting for Managers (4) *Noreen, Sundem* Provides potential managers with a basic knowledge of financial and managerial accounting. Focuses on the use, not the preparation, of accounting information. Examples presented for a variety of for-profit and nonprofit organizations.

ACCTG 505 Intensive Analysis of Accounting Principles and Practices (18) Covers the subjects in the required core for undergraduate accounting majors: intermediate accounting, advanced accounting, cost accounting, auditing, and tax accounting. Credits will not count toward MBA degree. Prerequisite: ACCTG 215 and ACCTG 225 or equivalent, or permission of instructor.

ACCTG 510 Introduction to Financial Statement Analysis (4) Extension of the core financial accounting material, focusing on the use of financial statements to assess the financial position and prospects of companies. Examines the critical financial reporting issues that influence interpretation of financial statements. Prerequisite: either B A 502, ACCTG 500, or permission of instructor.

ACCTG 511 Advanced Financial Statement Analysis (4) Covers accounting issues related to firm valuation and use of financial statement information to assess the risks and rewards of various firm strategies. Prerequisite: ACCTG 510 or permission of instructor.

ACCTG 513 Tax Effects of Business Decisions (4) Importance of tax considerations in making business decisions. Covers regulatory and economic impacts of the U. S. tax system. Prerequisite: either B A 502, ACCTG 500, or permission of instructor.

ACCTG 515 Problems in Managerial and Cost Accounting (4) Extension of the core management accounting material. Uses cases and discussion to analyze costing techniques, use of accounting data in planning and evaluation managerial performance, and use of accounting data in short-run and long-run decisions. Prerequisite: either B A 502, ACCTG 501, or permission of instructor.

ACCTG 517 Current Issues in Accounting (2) Analyzes recent literature, both professional and academic, in accounting. Focuses on the impact of recent events on the accounting profession. Prerequisite: either B A 502 or ACCTG 500, ACCTG 501, or permission of instructor.

ACCTG 519 Seminar in Financial Control Systems (4) Design and administration of formal information systems to aid the planning and control process in large organizations; formulation of divisional financial goals and control criteria; measurement of divisional performance and problems of goal congruence; administration of new investment programs. Prerequisite: B A 502 or permission of graduate office.

ACCTG 520 Information Quality and Assurance Services (4) Introduction to assurance services with a focus on financial statement audits. Auditing concepts and procedures, and the role of audits in financial markets.

ACCTG 521 Cases and Issues in Information Quality and Assurance Services (4) Analysis of cases and discussions of current issues dealing with assurance services. Prerequisite: ACCTG 520.

ACCTG 522 Advanced Financial Reporting (4) Advanced problems related to the measurement of enterprise income and asset and liability valuation.

ACCTG 523 Advanced Financial Analysis (4) Explores the use of published financial reports by

decision makers external to the firm (e.g. investors and creditors). Emphasis is on traditional and statistical analyses of financial statements for the purposes of making economic decisions. Prerequisite: ACCTG 522.

ACCTG 524 Individual Taxation (4) Political, economic, and social forces influencing federal income taxation, role of taxation in personal decisions. Coverage of individual tax matters, including business and investment income, business and personal deductions, property transactions, and tax issues of employees.

ACCTG 525 Business and International Taxation (4) Issues of taxation for entities other than individuals, including corporations, subchapter S corporations, partnerships, estates, and trusts. Included corporate distributions, liquidations, and reorganizations. International dimensions of business taxation are introduced. Prerequisite: ACCTG 524.

ACCTG 526 Preparation for IPOs and SEC Reporting (4) Introduces legal issues pertaining to the accounting profession. Discusses the role of operations of the SEC with an emphasis on its functions in regulating information disclosure. Prerequisite: ACCTG 522.

ACCTG 527 Communications in Professional Accounting (4) Introduction to the communications practices of professional accountants. Development of effective written and oral skills employed in accounting presentations such as audit reports. Study of results of organizational communications research applicable to accounting firms and units within firms.

ACCTG 530 Tax Issues in Property Ownership (4) Analysis of gain and loss realization, recognition, and characterization of such. Detailed exploration of statutory and case law regarding acquisition, ownership, and disposition of assets. Treatment of capital and ordinary gains and losses. Timing issues regarding deferral transactions and installment reporting are analyzed. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 531 Timing and Periods of Taxation (3) Analysis of the cash and accrual methods of accounting, choice of taxable period and multi-period transaction analysis. Consideration of statute of limitations and mitigation thereof. Details of passive activity losses. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 533 Procedural and Policy Issues (3) Analysis of the procedures of Federal taxation: assessment, collection, and refund claims. Detailed exploration of the rules governing the statute of limitations and the mitigation thereof. An introduction to tax policy considerations is given. Tax penalties are explored. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 534 Fundamentals of Corporate Taxation (3) Detailed analysis of contribution of assets to corporations. Calculation of recognized gains and basic effects of asset contributions. Treatment of income and deduction items of corporate operations. Analysis of distribution of assets to shareholders with respect to their stock. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 535 Advanced Issues in Corporate Taxation (3) A continuation of 534. Fundamen-

tals of moving assets out of and within corporate solution. Basics of corporate reorganizations: acquisitive and divisive. The details of the election to obtain (or avoid) the Section 338 election are explored in detail. Prerequisite: undergraduate accounting concentration or equivalent; ACCTG 534 or permission of instructor.

ACCTG 536 Advanced Issues in Corporate Taxation (3) Continuation of 534 and 535. Study of complex issues in corporate taxation planning. Substantial portion of course involves resolving case studies to improve analytic skills and to interrelate disparate corporate planning opportunities. Corporate reorganizations are analyzed in detail. Prerequisite: undergraduate accounting concentration or equivalent; ACCTG 535 or permission of instructor.

ACCTG 537 Income Taxation of Conduits I (3) Tax consequences to owners and entity from formation, operation, distributions from, and liquidation of partnerships and S corporations. Study of taxable and tax-free formations, nature of "bottom line" income and separately stated items, changes to owners' tax basis, basics of non-liquidating and liquidating distributions. Prerequisite: undergraduate accounting concentration or equivalent. Offered: W.

ACCTG 538 Income Taxation of Conduits II (3) A continuation of 537. Study of complex issues in partnership and S corporation taxation. Substantial portion involves resolving case studies to improve analytic skills and interrelate partnership and S corporation planning issues. Sections 751(b) and 736 examined in detail. Prerequisite: undergraduate accounting concentration or equivalent; 537 or permission of instructor.

ACCTG 539 Tax Research and Decision Making (4) Decision-making processes in relation to problems of taxation. Tools of tax analysis and research and the communication of conclusions flowing from professional tax work. Role of the professional accountant in client business transactions and in negotiations with taxing authorities is highlighted and simulated on the basis of actual case histories. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 540 Fundamentals of International Taxation (3) Covers the basic tax considerations of U.S. taxation of income earned worldwide by U.S. taxpayers as well as the tax issues regarding U.S. taxation of non-resident aliens for income earned in the United States. Source rules and treaty considerations examined in detail. Locating the proper source of income and optimal tax rates analyzed.

ACCTG 541 Communications for Taxation Professionals (4) Introduction to the communications forms and to practices professional accountants and accounting managers. Development of effective written and oral skills employed in accounting presentations, such as audit reports and consultants' reports. Study of results of organizational communications research applicable to accounting firms and/or units within firms. Prerequisite: undergraduate accounting concentration or permission of instructor.

ACCTG 543 Income Taxation of Trusts and Estates (3) Development of fundamental skills regarding income taxation of trusts and estates. Calculation of distributable net income and the

distribution deduction for the fiduciary entity. Basic analysis of the throwback rules. Case studies. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 547 Estate and Gift Taxation (3)

Development of fundamental knowledge of the unified transfer tax on the transfer of property from one person to another. Calculation of gross estate, adjusted gross estate, and taxable estate. Calculation of gift and estate taxes owing. Discussion of estate planning concepts. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 548 State and Local Taxation (3)

Differences in definition of income at state and federal levels, treatment of state income taxes, piggyback for state income taxes, state tax rates, minimum tax, double taxation of income by home and host states, Uniform Division of Income for Tax Purposes Act, concept of nexus for taxation, multistate tax planning. Offered: S.

ACCTG 549 Employee Tax Problems and Deferred Compensation (3) Covers the tax issues facing employees and self-employed tax payers, including deferred compensation arrangements, fringe benefit packages, restricted property, independent contractor status, achieving favorable tax treatment of retirement plans, and substantiating employee business expenses. Offered: S.

ACCTG 551 Management Information Systems (4)

Develops the professional accountant's responsibilities in designing and operating management information systems with an emphasis on accounting systems. Data organization and management, effects on accounting functions, responsibilities for controls and security, and planning and acquisition of system resources. Prerequisite: ACCTG 330, I S 320 and B A 501 or equivalent.

ACCTG 555 Statistical Methods in Professional Auditing (4)

Comparative analysis of the methods of statistical inference used in auditing and incorporation of these methods in the auditor's decision processes. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 558 Current Financial Accounting and Reporting Issues (4)

Develops professional-level ability to understand, analyze, and report upon selected political, economic, social, and legal dimensions of current financial accounting and reporting issues. Issues vary each year. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 559 Advanced Auditing Problems and Cases (4)

Analysis of current developments in auditing and comprehensive case studies. Designed to extend knowledge of audit decision making and advanced techniques. Topics covered vary depending upon current issues facing professional auditors. Prerequisite: undergraduate accounting concentration or equivalent.

ACCTG 560 Special Topics in Professional Accounting (1-4, max. 4)

Lectures, discussion, and case analyses dealing with special current topics relevant to professional accounting. Satisfies the professional accounting elective requirement for the M.P.Acc. degree program. Prerequisite: permission of instructor.

ACCTG 562 Accounting for Business

Combinations in a Global Marketplace (4) The examination of acquisitions and mergers in a global context. Explores the issues involved in accounting for domestic and foreign equity investments, partnerships with respect to financial statement interpretations.

ACCTG 564 Governmental Accounting (4)

Budgetary and financial accounting/reporting as applied at the state, local, and special-purpose governments; financial accounting and reporting for not-for-profit organizations.

ACCTG 566 Issues in International Accounting (4)

Insights into the conceptual, managerial, professional, and institutional issues of international accounting. Focus on current topics in international accounting and on the cultural, managerial, and governmental forces that shape both internal and external accounting in specific countries.

ACCTG 568 Advanced Management Accounting (4)

Discussion and analysis of costing techniques, use of accounting data in planning and evaluating managerial performance, and use of accounting data in short-term and long-run decisions. Special attention directed to issues in human behavior involved in cost allocation, budgeting, and performance evaluation. Prerequisite: ACCTG 502.

ACCTG 575 Internship (14)

Professional internship in graduate accounting program. Prerequisite: enrollment in MPAcc program, accounting and assurances track.

ACCTG 576- Independent Research Project Proposal (2-)

Topic identification and development for research project to be completed in ACCTG 577. Prerequisite: enrollment in MPAcc program, accounting and assurances track.

ACCTG 577 Independent Research Project Proposal (-4)

Development and completion of independent research project. Topic identification and proposal approval completed in ACCTG 576. Prerequisite: enrollment in MPAcc program, accounting and assurances track; ACCTG 576.

ACCTG 580 Introduction to Accounting Research (4)

Examination of research problems and techniques in accounting. Interdisciplinary nature of accounting research emphasized. Work in finance, economics, and psychology used to develop current trends in accounting research. Prerequisite: doctoral student status.

ACCTG 581 Seminar in Managerial Accounting (4)

Critical examination of conceptual and practical issues of cost and managerial accounting. Specific topics may change from quarter to quarter, and they include application of behavioral, quantitative, and economic models to managerial accounting problems. Prerequisite: ACCTG 511 or permission of instructor.

ACCTG 596 Seminar in Financial Accounting Research (4)

Review and critical analysis of research strategies and methods applied to problems in financial reporting practice and financial accounting standard setting. Prerequisite: doctoral student status and ACCTG 580 or equivalent or permission of graduate office.

ACCTG 597 Seminar in Managerial Accounting Research (4)

Critical analysis of current managerial accounting research, both published and unpublished. Prerequisite: doctoral student status and 581 or equivalent or permission of graduate office.

ACCTG 599 Doctoral Seminar in Accounting (1, max. 12)

Study and research in advanced topics of Accounting. The seminar is generally concerned with unpublished areas of research as well as research methodology and philosophy. It is conducted by departmental faculty and occasional distinguished visiting faculty. Prerequisite: doctoral student status.

ACCTG 600 Independent Study or Research (*, max. 10).

Administration

ADMIN 510 Integrative Administration ([1-15, max. 15]-) Huber

Includes materials basic to study and analysis of administration in organizations; organization theory and administrative behavior; human resources management; resource allocation, accounting, and financial control, systems operation and analysis; marketing; governmental-societal framework; policy formulation and strategic planning. Faculty team-teaching approach. Not open to business administration majors. Credit/no credit only.

Business Administration Research Methods

BA RM 580 Applied Econometrics I (4)

Emphasizes the application of econometric methods rather than the mathematical proofs of statistical procedures. Introduction to the linear regression model, interpretation of summary statistics, bias and precision of regression estimates, analysis of the residuals, and hypothesis testing. Prerequisite: STAT 342 or STAT 395 or STAT 481, or permission of instructor.

BA RM 581 Applied Econometrics II (4)

Continuation of 580. Measurement errors, distributed lags, and simultaneous equation models. Prerequisite: BA RM580.

BA RM 590 Behavioral Research Methods-Theory and Design (4)

Philosophy of science, development of scientific method, and meaning of behavioral research. Historical perspective of scientific investigation and the evaluation of research. The development of theory and its relationship to research. Various strategies and designs in behavioral research. Prerequisite: STAT 361, STAT 362, or permission of instructor.

BA RM 591 Behavioral Research Methods-Approaches and Applications (4)

Considers alternative research approaches, such as laboratory and field experimentation, simulation, and surveys, with data-gathering techniques appropriate for each approach. It is primarily concerned with developing alternative approaches to research problems and with discussing specific applications. It builds upon a background of specific statistical tools and techniques and an understanding of theory development and research design. Prerequisite: STAT 361, STAT 362, or permission of instructor.

Business Administration

B A 300 Foreign Study-Business Administration (3-5, max. 15) For participants in approved foreign-study programs where equivalent UW business administration courses are not available.

B A 390 Business Honors Seminar (2-5, max. 5) Special topics in business. Required for honors students in Business Administration.

B A 410 Business Advantage (10) Four-week integrative course which focuses on business basics — finance, accounting, marketing strategy and human resources. Team-taught by faculty experts using case discussions, lectures, and student presentations. Not open for credit to students pursuing a Business degree.

B A 470 Accounting and Finance for Non-business Majors (3) QSR Addresses economic foundations of demand, supply, and costs as basis for accounting system. Focuses on using data for evaluating performance, budgeting and financial statement analysis. Short-term and long-term decision making compared. Not open for credit to students pursuing a Business degree. Offered: A.

B A 471 Marketing Analysis and Strategy for Non-business Majors (3) I&S Provides understanding of marketing principles and their usefulness in diverse business and organizational situations. Includes study of controllable and uncontrollable factors in making marketing decisions; developing working knowledge of marketing strategy and understanding of implications of product life cycle for decision-making. Not open for credit to students pursuing a Business degree. Offered: W.

B A 472 Managing Human Assets for Non-business Majors (3) I&S Deals with understanding management of human resources in businesses and other organizations. Includes study of relevant theories and research, analyses of cases, and experiential exercises including overview of new work place, diversity, leading, deciding, negotiations, attracting, motivating and rewarding, and team management. Not open for credit to students pursuing a Business degree. Offered: Sp.

B A 500 Business Administration I (16) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 501 Business Administration II (14) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 502 Business Administration III (8) Coordinated series consisting of accounting, business economics, business ethics, business policy, finance, information systems, international business, legal environment of business, management, and organizational behavior, marketing, operations management, and quantitative methods for management. Prerequisite: permission of the School of Business Administration.

B A 541 Environmental Management I (4) Survey of environmental ethics, environmental

laws and regulation, the economics of environmental decisions, and the relationship of business to public policy and the environment. Must be taken concurrently with B A 544. Prerequisite: permission of instructor.

B A 542 Environmental Management II (4) Applications of the functional areas of business to environmental concerns. Major federal legislation affecting these concerns applied to business problems in the areas of accounting, finance, marketing, management information systems, and organizational behavior. Must be taken concurrently with 544. Prerequisite: B A 541 or permission of instructor.

B A 543 Environmental Management III (4) Case studies that integrate the fundamentals of business and environmental management to address such issues as plant siting, regulatory compliance, production line changes, and innovative, proactive responses to environmental issues. Case studies include results of student consulting projects and a capstone case in environmental management. Must be taken concurrently with 544. Prerequisite: B A 542 or permission of instructor.

B A 544 Environmental Management Seminar (1, max. 3) Guest lecturers from academia, business, government, and advocacy groups discuss environmental science, ethics, law, regulation, economics, finance, accounting, and policy issues. Seminar topics supplement course material in 541, 542, 543 which are to be taken concurrently.

B A 545 The Global Business Forum: Current Issues in Global Business (1, max. 3) Discussion of current trends in the global business environment and of international issues facing companies. Leaders from international businesses and other organizations, as well as faculty members from various departments and specializations, invited to share their perspectives with seminar participants. Topics change each quarter.

B A 560 Cooperative Education in Business (1) Business practicum: internship with approved business or governmental agency. Open only to students who meet requirements of internship program. Internship credit may not be applied to fulfill specific course requirements or to credits required for graduation. Credit/no credit only. Offered: S.

B A 571 Research Reports (4-) Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas emphasized. Methods and content of independent research studies subjected to critical evaluation. Open only to MBA non-thesis students. Prerequisite: instructor's approval of preliminary research topic outline.

B A 572 Research Reports (-4) Independent study in business administration; critical evaluation of business analysis and research methods. Effective communication of ideas emphasized. Methods and content of independent research studies subjected to critical evaluation. Open only to MBA non-thesis students. Prerequisite: B A 571.

B A 578 Practicum in Business Management (2) Provides an opportunity for first-year MBA students to apply the skills learned in the classroom to real world problems. Students participating in the Business Consulting Network

(BCN) partner with client firms on an applied learning project that offers additional training opportunities not possible in the classroom. Credit/no credit only.

B A 580 Problems in Microeconomics (4) Study of microeconomic intuition, directed toward Business School Ph.D. students, showing the interconnections between formal, mathematical analysis and the unstructured economic questions posed by the world. Emphasis on setting up problems and examining the intuition behind the analysis of them. Many applications to specific business issues.

B A 700 Master's Thesis (*) .

B A 800 Doctoral Dissertation (*, max. 10).

Business Communication

B CMU 301 Basic Written Business Communications (4) Broad analytical approach to written communications as a management tool. Analysis of the psychology, semantics, planning, and principles of effective business writing. Practical application through messages that inform and persuade, grant and refuse; plus short business reports and applications for positions. Cannot be taken for credit if B CMU 302 already taken. Offered: AWSp.

B CMU 302 Basic Written Business Communications for Accounting Majors (4) Broad analytical approach to written communications as a management tool for accountants. Analysis of the psychology, semantics, planning, and principles of effective business writing. Practical applications through messages that inform and persuade, grant and refuse; plus short business reports and applications for positions. Cannot be taken for credit if B CMU 301 already taken. Corequisite: ACCTG 301.

B CMU 410 Business Reports and Other Specialized Communications (4) Covers internal and external, written and oral business reporting. Considers communications strategies within the context of rapidly changing technologies. Students learn to apply primary and secondary research to quarter-long, individual projects resulting in a variety of reports: proposals, progress reports, feasibility studies, business plans, etc. Prerequisite: B CMU 301 or B CMU 302.

B CMU 490 Special Topics in Business Communications (1-6, max. 12) Students and faculty focus on current topics of concern. Prerequisite: either B CMU 301 or B CMU 302.

B CMU 499 Research in Business Communications (1-6, max. 9) .

B CMU 509 Finding your Voice (2) Develop a leadership communication style by discovering core values and learning how to translate those values into effective messages. Students give speeches as well as critique speeches of classmates, produce written evaluation of speeches given in class and receive instructor feedback. Prerequisite: BA 501.

B CMU 510 Business Communications for Managers (4) Develops understanding of communication theories, describes strategies for planning managerial communications, and builds skills in oral and written reporting and persuading. Looks at how new technologies are changing the way people in business communicate, and

the implications those changes have for organizations. Prerequisite: B A 501.

B CMU 579 Special Topics in Business Communication (2/4, max. 12) Business and managerial communication topics of current interest to faculty and students.

Business Economics

B ECON 301 Intermediate Macroeconomics (4) Analysis of economy with attention to the business cycle, output of goods and services (GNP), inflation, unemployment, and government's fiscal and monetary policies. How the economy affects individuals and firms and how to deal effectively with the economic environment. Prerequisite: ECON 201; may not be repeated.

B ECON 420 Financial Markets (4) Analysis of the structure and functions of the money and capital markets; the saving-investment process and financial intermediaries; supply and demand for lendable funds and the level and structure of interest rates, role of Federal Reserve and Treasury in money market developments. Prerequisite: either B ECON 301 or ECON 301; may not be repeated.

B ECON 426 Competing in the Global Economy (4) Examines the global environment for business and the challenges facing managers in this environment. Explores the implications of the common phrase "think global — act local." Prerequisite: either B ECON 300 or ECON 300; either B ECON 301 or ECON 301.

B ECON 427 International Finance (4) Asset choice and institutional operations in international finance, foreign exchange problems, the impact of international financial problems and operations on business, short- and long-term international financing. Prerequisite: either B ECON 300 or ECON 300; either B ECON 301 or ECON 301; may not be repeated.

B ECON 490 Special Topics in Business Economics (1-6, max. 6) Study and research on topics of current concern to faculty and students. Only offered when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

B ECON 499 Undergraduate Research (1-6, max. 9) Research in selected areas of business economics. Recommended: either ECON 301 or B ECON 300 and B ECON 301.

B ECON 500 Introduction to Business Economics (4) Factors underlying the determination of cost and prices for the industry and the firm, demand and supply analysis and firm behavior. The relation of the economic environment to the microeconomic decisions of the firm.

B ECON 501 Macroeconomics and Global Issues (4) Analysis of real and monetary factors affecting national and international economics, supply and demand for money, interest rates and stabilization problems and policies, in relation to government policy effects on business and individual affairs. Focuses on global macroeconomic issues. Prerequisite: B ECON 500.

B ECON 520 Financial Markets (4) Analysis of the structures and functions of financial markets and institutions; the behavior of interest rates

through time; the cross-sectional structure of interest rates; and the roles of the Federal Reserve and Treasury in financial markets. Prerequisite: FIN 509.

B ECON 526 Competing in the Global Economy (4) Examines the global environment for business and the challenges facing managers in this environment. Explores the implications of the common phrase "think globally — act locally." Offered: jointly with MGMT 526; WSp.

B ECON 579 Special Topics in Business Economics (2/4, max. 12) Business economics topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offering. Prerequisite: permission of instructor.

B ECON 600 Independent Study or Research (*, max. 10).

Business Policy

B POL 482 Strategies for New Ventures (4) Focuses on market analysis and strategy formation. Includes building an entrepreneurial firm, market opportunity analysis, product testing, developing and implementing business plans, venture financing, and managing a growing company. Prerequisite: B POL 471; MKTG 335; MKTG 455; FIN 454.

B POL 499 Undergraduate Research (1-6, max. 9).

Electronic Business

EBIZ 501 E-Business Marketing (4) *Schlosser* Uses current strategies for Internet marketing and explores new frontiers. Topics include examining the history, culture, and design of the Internet and the resulting impact on marketing; Web-based business models; consumer demographics; Web usage behavior; privacy issues; brand loyalty; virtual communities; and commercial Web site effectiveness metrics. Offered: W.

EBIZ 502 E-Business Technology (4) *Mookerjee* Examines the underlying information technologies that are driving the e-business revolution, including the overall technical infrastructure required to execute an e-business solution. Taught via lectures, projects, and hands-on sessions in the E-Business lab. Students implement and manage an e-business site. Offered: A.

EBIZ 503 E-Business Economics (4) *Rice, Schall, Tarhouni* Uses economic principles to assess the implications of evolving Internet technology for business decision-making, market prices, and market structure. Develop theoretical extensions of the models covered in B A 500 to analyze the questions that the Internet poses. Includes a group paper and a group evaluation of an Internet company. Offered: W.

EBIZ 504 E-Business Strategy (4) *Kotha* Integrates issues pertaining to management of technology and entrepreneurship: the emergence of the global digital economy and its impact on commerce, business models in e-commerce, "netpreneurship" and its place in existing corporations. Lectures and featured speakers from online Seattle firms, case discussions, and group projects. Offered: ASP.

EBIZ 509 Foundations of E-Business (2) Examines the fundamental technologies associated with business-to-consumer and business-to-business interaction and delivery of content via the Internet. Contrasts clients- versus server-side approaches to database processing and XML, and execution of business rules and logic. Includes experience with the various technologies. Prerequisite: Permission of School of Business Administration. Offered: Sp.

EBIZ 579 Special Topics in E-Business (2-4, max. 12) Topics vary. Offered only when faculty members are available and there is sufficient student interest.

EBIZ 600 Independent Study or Research (8, max. 10).

Executive MBA

EMBA 501 Effective Communications Strategies (1) Focuses on effective communications strategies in the corporate world with an emphasis on the conveying of ideas, presentation strategies and how to focus on clear and concise communication with the internal or external customer. Offered: A.

EMBA 502 Teamwork and Managerial Effectiveness (2) Focuses on issues of working and problem-solving effectively in small groups, with some attention to the personal and professional stress under which many general managers operate. Offered: A.

EMBA 503 Managing in the Workplace (2) Examines how intra- and extra-organizational factors influence the utilization of human capital, and how organizations' responses to those factors determine their effectiveness. Topics include human resource policy and control, executive compensation and development, and HRM in the multinational context. Offered: A.

EMBA 504 Strategic Competitive Analysis (4) Examines the nature of the competitive process and the source of firm-level competitive advantage. Focuses on the economic principles of competition and applying these principles to the study of competitive advantage and strategy. Offered: A.

EMBA 505 Financial Reporting and Analysis (5) An introduction to financial accounting from a management perspective. Topics include preparation and use of financial statements; measurement and reporting of assets, equities, and income; and issues and implications of alternative methods of reporting. Cases based on actual corporate financial statements used to enhance the participants' understanding of the issues. Participants will be required to evaluate financial statements of their own or a teammates' company. Offered: .

EMBA 506 Leadership and Motivation (1-5, max. 15) .

EMBA 508 Leadership and Organizational Effectiveness (4) .

EMBA 510 Statistics for Management (3) An introduction to statistical techniques useful for aiding management decisions. Emphasis is placed on use of interactive computer methods in basic business problems. Topics include summary statistics of numerical data, statistical inference, linear regression and elementary time series analysis. Offered: W.

EMBA 511 Dynamics of Negotiations (1)

Explores negotiations a manager is involved with both internally and externally. Topics include the nature of negotiations, the role of power in negotiations, negotiation planning and strategies for improving negotiation relationships.

EMBA 512 Managerial Accounting (4)

Overview of the preparation and use of accounting information by managers for decision-making purposes. Topics include cost concepts, cost behavior, overhead allocation (including activity-based costing), budgeting, responsibility accounting, short-term decisions and capital budgeting. Cases based on actual management decisions used to enhance understanding of concepts and techniques. Offered: W.

EMBA 520 Financial Management (5)

Introduction to corporate financial management emphasizing relevant modern theory and practical applications. Topics include financial statement analysis, financial planning, financial markets, principles of valuation, capital budgeting, capital structure, the cost of capital, dividend policy, merger analysis and issues of financial policy. Offered: Sp.

EMBA 521 Creating Effective Organizations (4)

Bigley Introduces concepts and principles fundamental to creating and leading effective organizations. Includes perception and decision-making, employee motivation, group and team process, human resource management practices, organizational design, power and politics, corporate culture, and organizational change. Special topics include creativity and innovation and managing organizational crises. Offered: Sp.

EMBA 527 Business Development Management (4)**EMBA 529 Special Topics (1-5, max. 15)**

Explores issues of current interest and concern to general managers and feature business and community leaders recognized for their expertise in specific fields. Offered: Sp.

EMBA 530 Decision Support Models for Management (3)

GE Presents and illustrates the use of techniques (such as simulation, heuristics, queuing, decision analysis and linear programming) that have been developed to help managers deal with complicated choice problems in manufacturing, service operations, marketing and other areas. Offered: A.

EMBA 531 Global Economic Environment of the Firm ([2-5]-, max. 5) Builds a framework for understanding movements in economy-wide magnitudes – such as the price level, the gross domestic product, the unemployment rate, the interest rate and the exchange rate- that affect business decisions. Analyzes contemporary economic issues that impact business, including the recent conduct of monetary and fiscal policy, growth, competitiveness and trade. Offered: A.

EMBA 532 Marketing Strategies ([1-4]-, max. 5)

Examines the tactical and strategic relationships, and effects, of product management, promotion, distribution, and pricing in both consumer and business-to-business contexts. Particular attention is given to growth strategies, to cross-functional approaches to discovering and satisfying the customer, and to creating and sustaining a market-driven learning culture in an organization. Offered: AW.

EMBA 533 Operations Management and Systems Analysis (4)

Explores how to

continuously deliver superior value for customers in a profitable manner through the design, planning and control of goods and services operations. Develops problem-solving skills in describing process flows, resolving bottlenecks, and measuring and improving performance. Offered: W.

EMBA 534 Ethical Leadership (2) Examines business ethics through case studies and short readings in ethical history. Emphasizes the development of a framework that helps managers make ethical decisions in a business environment. Offered: AW.

EMBA 540 International Finance (2) Introduces international finance at the level of the firm. Topics include understanding exchange rates, international parity conditions, measuring and managing exchange exposure, international financial markets, and trade financing. Emphasizes the practical implications of modern theory. Offered: W.

EMBA 541 Managing Technology and Innovation (2) Explores a selected management issue from a strategic perspective. Offered: WSp.

EMBA 551 International Management (2-, max. 4)

Studies the formulation of corporate responses to the international environment. Emphasized understanding international economic forces and national and international policies affecting trade and investment; developing corporate strategies in the context of global competition; and exploring issues in the management of international business. Offered: WSp.

EMBA 552 Managing Change (2) Explores why firms succeed or fail. Focuses on business or corporate level strategies and structures that increase the probability of success and decrease the probability of failure by establishing a competitive advantage. Offered: S.

EMBA 553 Corporate Entrepreneurship (2-, max. 4) *Kotba* Focuses on entrepreneurial activities in large corporations and the process of converting new ideas to new commercial products and businesses. Offered: WSp.

EMBA 558 General Management and Strategy (4)

Hill Focuses on the factors that increase the probability of an organization's success or failure. Topics included the role of the following in determining competitive advantage: strategic planning and leadership, operations and business strategy, technological and innovation strategy, diversification and vertical integration, global strategy, organizational architecture, and organizational change efforts.

EMBA 590 Special Topics in General Management (1-5, max. 15) Reviews one or more selected topics relevant to the enhancement of general management skills. Offered: .

Entrepreneurship

ENTRE 370 Introduction to Entrepreneurship (4)

Introduction to entrepreneurial practices with an emphasis on learning how to find business ideas, how to evaluate their potential, and how to recognize the barriers to success. Exposure to the stresses of a start-up business, the uncertainties that exist, and the behavior of entrepreneurs. Prerequisite: ACCTG 225, ECON 200, and ECON 201.

ENTRE 472 Creating a Company I (4-) Two-course sequence with ENTRE 473. Working in teams, students develop a business plan for a new venture, present their plans to a panel of investors, obtain funding, run the business, and exit the firm at the end of the second quarter. Prerequisite: ENTRE 370. Offered: AW.

ENTRE 473 Creating a Company II (-4) Two-course sequence with ENTRE 472. Working in teams, students develop a business plan for a new venture, present their plans to a panel of investors, obtain funding, run the business, and exit the firm at the end of the second quarter. Prerequisite: ENTRE 472. Offered: WSp.

ENTRE 475 Planning for Business Growth I (4-)

Two -course sequence with ENTRE 476. Explores the challenges/requirements of transforming an idea into a business. Emphasizes developing business concepts/strategy, marshalling resources, proving the business model, and creating strategic plans for growth. Students are required to participate in the business plan competition held the following quarter. Prerequisite: ENTRE 370.

ENTRE 476 Planning for Business Growth II (-4)

Two course sequence with ENTRE 475. Students supplement business plans with operational and financial details to demonstrate viability of the venture; learn how to present the company to corporate executives or outside investors; and enter the plan in the business plan competition. Prerequisite ENTRE 475.

ENTRE 509 Foundations of Entrepreneurship (2)

Evaluation of new market opportunities and starting a new venture, focuses on identifying and evaluating new venture opportunities, developing and testing market strategies, evaluating test market performance, and evaluating business plans. Emphasizes the interplay between marketing, manufacturing, finance, accounting and team management. Prerequisite: Permission of School of Business Administration. Offered: Sp.

ENTRE 510 Entrepreneurial Ventures (4)

Uses the tools of competitive strategy to analyze the success and failure of entrepreneurial ventures, identifying general strategic principles that might increase the probability that an entrepreneurial venture will succeed. Draws heavily on the principles of microeconomics and strategy. Prerequisite: B A 500; B A 502.

ENTRE 511 Entrepreneurial Marketing (2)

Focuses on marketing issues related to the generation and development of innovative ideas, assessment of feasibility, implementation and execution, and valuation of business ventures, highlighting the real world applications by new ventures. Prerequisite: B A 501 and entrepreneurial bridge course.

ENTRE 521 Corporate Entrepreneurship (4)

Focuses on entrepreneurial activities in large, established corporation. Introduces the theory and best practices on the process of converting new ideas to commercial products and new businesses. Prerequisite: B A 500; B A 501; B A 502. .

ENTRE 530 New Venture Creation and Managing Growth (4)

Song Focuses on gaining experience in market analysis, new venture strategy formulation, and the management of a new venture. Topics include building an entrepreneurial firm, market opportunity analysis, product testing, developing and executing

business plans, venture financing, and managing a growing company. Prerequisite: B POL 509; B A 501. Offered: W.

ENTRE 531 Developing Business Models for Emerging Technologies (4) *Song* Focuses on the commercialization of emerging technologies. Topics include conducting feasibility assessments of intellectual property landscape, evaluating business opportunities, analyzing competition, developing business models and strategies, constructing a professional quality business plan, and presenting business plan, transforming a new technology into a market-ready technology-based business. Offered: W.

ENTRE 532 Software Entrepreneurship (4) A case- and project-based course, focusing on starting a software or hardware company. Guest entrepreneurs, lawyers, and financiers discuss market identification and analysis, planning the business, financing, and typical operating and administrative problems.

ENTRE 540 Entrepreneurship Practicum (2, max. 4) *Bigley, Sundem* Enables students interested in new venture creation to explore their entrepreneurial aptitude by competing in a Business Plan Competition offered by the Center for Technology Entrepreneurship. Requires enrollment in the CTE certificate program. Credit/no credit only.

ENTRE 557 Entrepreneurial Finance (4) Analyzes the unique financial issues facing entrepreneurial firms. Topics include assessing financial performance, financial forecasting and planning, financial management of rapidly growing businesses, start-up ventures, valuation, sources of financing, venture capital, initial public offerings, and the decision to harvest. Prerequisite: MBA core courses. Offered: jointly with FIN 557.

ENTRE 579 Special Topics in Entrepreneurship (2-4, max. 12) Topics vary. Offered only when faculty members are available and there is sufficient student interest.

ENTRE 581 Theoretical Foundations of Entrepreneurship (4) *Song* Focuses on theoretical overview, entrepreneurs, environment and organizational founding, entrepreneurship's links with other disciplines, venture capital and venture capitalists, new venture strategy and performance, growth processes and challenges, and entrepreneurial networks and alliances. Class sessions review and critique assigned readings associated with each topic. Offered: A.

ENRE 582 Technology, Innovation, and Entrepreneurship (4) *Kotha* Explores issues of how a knowledge-based economy competes and performs using technological innovations and entrepreneurship. Explores research on capabilities of broader entities; processes of learning at the firm, industry, technology, economy-level; development of know-how as evolutionary process; and explorations by firms, sectors and economies exploring new technologies and techniques. Offered: W.

ENTRE 590 New Venture Research Practicum (4) *Kotha, Song* Exposes students to new venture creation phenomena. Teaches how to think about and understand empirical research methods such as case studies, participant-observation, and other field methods while contributing to on-going cumulative data collection process.

ENTRE 600 Independent Study or Research (*, max. 10) .

Global Executive MBA

GEMBA 500 Yonsei-Business Principles and Applications I (16) Business Administration core topics including business economics, human resources, data analysis, information technology, financial accounting, management, accounting, marketing, and other business related topics. Offered: S.

GEMBA 502 Yonsei-Business Principles and Applications II (16) Business Administration core topics including human resources, operations management, financial management, competitive strategy, international business, marketing research, case studies, and other business related topics. Offered: S.

GEMBA 510 Financial Management (4) Explores finance as the heart of business management. Reinforces and advances skills in financial management. In addition to reviewing basic financial principles, teaches advance techniques of financial analysis. Applies knowledge of business analysis, competition, and strategy. Offered: A.

GEMBA 511 Communication and Negotiation Skills for International Managers (4-6, max. 6) Focuses on learning to use the English language to conduct business more effectively. Actively exercise negotiation and public speaking skills, learn about informative versus persuasive communication, and practice various modes of verbal and non-verbal communication. Offered: S.

GEMBA 512 Competitive Analysis in a Global Economy (4) Focuses on competitive strategy and structure in technology-driven industries in global industries. Requires student to integrate information on decisions requiring trade-off among various functional areas and strategies. Focuses on how the decision-maker operates, the pressures of performance, and resource limitations in which executives operate. Offered: A.

GEMBA 514 Organizational Effectiveness (4) Focuses on managing people in global organizations. Examines practical strategies for dealing with cultural differences and considers the managerial implications of contemporary debates about Asian values, the impact of globalization on workers worldwide, and the potential for a "clash of civilizations." Offered: W.

GEMBA 516 Macroeconomics (4) Explores how market forces worldwide influence global business. Examines national income product and balance of payments accounting. Covers trade theory and policy, exchange rate determination, and currency crisis. Offered: W.

GEMBA 520 Topics in General Management (4) Current business topics such as ethics, financial management, negotiations, and other topics of interest. Offered: Sp.

GEMBA 579 Special Topics in Global Business (2/4, max. 12) Study of special topics. Enrollment by permission only.

Finance

FIN 350 Business Finance (4) Sources, uses, cost, and control of funds in business enter-

prises. Internal management of working capital and income sources and cost of long-term funds; capital budgeting; financing of the growth and expansion of business enterprises; government regulation of the financial process. Prerequisite: ACCTG 225; ECON 201; either MATH 112, MATH 124, MATH 125, MATH 134, MATH 145, or Q SCI 291; either IND E 315, MATH 390, QMETH 201, Q SCI 381, PSYCH 315, PSYCH 318, STAT 220, STAT 311, or STAT 390.

FIN 423 Banking and the Financial System (4) Role of banks and nonbank financial institutions in the financial system; asset choices of banks and nonbank financial institutions; problems in the management of financial institutions with emphasis on commercial banks. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 428 International Financial Management (4) Analysis of financial problems facing businesses engaged in international activities. Financing foreign investment, financial control of foreign operations, and working capital management including foreign exchange positions using cases and readings. Prerequisite: FIN 350.

FIN 450 Problems in Corporate Finance (4) Case problems in corporate financial management. Includes cases on management of current assets, obtaining short-term loans, raising long-term capital, capital budgeting, and dividend policy. The management point of view is stressed. Prerequisite: FIN 350; either B ECON 300 or ECON 300.

FIN 453 Financial Theory and Analysis (4) Business financial strategic planning. Topics include business valuation and financing, performance evaluation, risk analysis, capital budgeting, and inflation and taxes. Emphasizes tools with real-world applications while incorporating modern finance concepts. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 454 Business Valuation, Investment, and Financing (4) Key issues in financial management using both analytical and case study illustrations. Valuation of public and private companies; cost of capital estimation; investment complications, such as taxes, inflation, risk, project interdependencies, and financing-investment interactions; leasing; mergers; spin-offs and carve-outs. Prerequisite: FIN 350; either B. ECON 300 or ECON 300.

FIN 457 Entrepreneurial Finance (4) Explores financial issues that face entrepreneurs, including the stages of financing, business cash flow models, and strategic positioning of the early-stage company. Examines the role of business angels, venture capital funds, institutional investors, strategic alliances, licensing agreements, and exit strategies. Prerequisite: FIN 350; either B ECON 300 or ECON 300. Offered: W.

FIN 460 Investments (4) Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate-of-return aspects of particular securities portfolios, and total wealth. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 461 Financial Futures and Options Markets (4) Introduction to financial futures and options markets. Institutional aspects and social

functions of these markets, pricing of options and futures, and risk shifting by hedging. Prerequisite: FIN 350; either B ECON 300 or ECON 300; may not be repeated.

FIN 462 Management of Financial Risk (4) y Modern tools for managing financial risk. Fixed income securities and interest rate risk, credit risk, foreign currency risk, and insurance. Emphasis on use of futures, forwards swaps, and option contracts. Prerequisite: FIN 350; either B ECON 300 or ECON 300; FIN 461.

FIN 490 Special Topics in Finance (1-6, max. 6) Study and research on topics of current concern to faculty and students. Only offered when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings.

FIN 495 Finance Internship (1-4, max. 8) Internship with a private firm, nonprofit organization or government agency, where work experience involves substantial application of finance concepts learned in classroom. Credit/no credit only. Prerequisite: FIN 350. Offered: AWSpS.

FIN 499 Undergraduate Research (1-6, max. 9) Research in selected areas of business finance, money and banking, or investments, with permission of instructor. Recommend: FIN 350; either B ECON 300 or ECON 300.

FIN 502 Business Finance (4) Financial management of the firm, including capital budgets, working capital analysis, and financing policy. Prerequisite: ACCTG 500, B ECON 500, QMETH 500.

FIN 509 Foundations of Asset Valuation (2) Introduction to valuation, focusing on topics in asset-pricing, fixed income, financial options, and international markets. Emphasizes both theoretical and applied concepts. Course material prepares students for advanced topics covered in the finance electives. Prerequisite: either B A 501 or FIN 502, or permission of School of Business Administration. Offered: Sp.

FIN 530 Financial Management of Banks (4) Analysis of problems in the financial management of commercial banks and other financial institutions. Loan and investment policies, liability management, capital policies, and other selected issues are discussed. Prerequisite: B ECON 520 or permission of graduate office.

FIN 550 Advanced Business Finance (4) Systematic coverage of key theoretical issues in financial management. Application of quantitative analysis to financial problems of the firm that are important in practice, including issues related to financing and investment. Prerequisite: FIN 509.

FIN 551 Problems in Business Finance (4) Uses case studies to examine a broad range of financial management topics, including forecasting financial statements, use of bank credit, working capital management, public and private securities issues, capital budgeting, and business valuation. Prerequisite: B A 502.

FIN 552 Problems in Corporate Planning and Financing (4) Uses case studies to examine business financing. Topics include financial statement analysis, financial planning and forecasting, banking relationships, and financing sources, including the use of derivative securities, venture capital, and private equity. Cannot be taken for credit in combination with FIN 551. Prerequisite: FIN 509.

FIN 553 Problems in Capital Investment Planning (4) Case discussions used to examine corporate resource allocation decisions. Topics include capital budgeting techniques, estimation of capital costs, capital budgeting systems, strategic investment decisions, and financial restructurings. Prerequisite: FIN 509.

FIN 555 Financing Decisions, Payout Policy, and Corporate Control (4) Analysis of business financing methods, payout policy, management compensation, ownership structure, and the distribution of control rights. Covers the major issues critical to structuring contracts within the corporation. Prerequisite: FIN 509.

FIN 556 Business Valuation and Investment Analysis (4) Valuation of business enterprises, evaluation of financial performance, analysis of complex investment opportunities, business taxation, leasing, and business acquisitions. Emphasis on complications encountered in practice. Prerequisite: FIN 509.

FIN 557 Entrepreneurial Finance (4) Analyzes the unique financial issues facing entrepreneurial firms. Topics include assessing financial performance, financial forecasting and planning, financial management of rapidly growing businesses, start-up ventures, valuation, sources of financing, venture capital, initial public offerings, and the decision to harvest. Prerequisite: MBA core courses. Offered: jointly with ENRE 557.

FIN 558 Mergers and Acquisitions (4) *Harford* Advanced finance topics focusing on providing the necessary training to value, structure and close acquisitions. Additional topics include antitrust issues, the legal environment governing mergers, and antitakeover defense. Offered: WSp.

FIN 560 Investments (4) Introduction to the nature, problems, and process of evaluating particular securities and portfolio construction and administration. Special attention is directed to the risk and rate of return aspects of particular securities, securities portfolios, and total wealth. Prerequisite: FIN 509.

FIN 561 Financial Futures and Options Markets (4) Overview of futures markets and options markets. Analysis of pricing of futures contracts and options; comparison of futures, forward, and options contracts; risk management with hedging; alternative investment strategies; and review of empirical evidence. Prerequisite: FIN 509.

FIN 562 Management of Financial Risk (4) Modern tools for managing financial risk. Fixed income securities and interest rate risk, credit risk, foreign currency risk, and insurance. Emphasis on use of futures, forwards, swaps, and option contracts. Prerequisite: FIN 509.

FIN 563 Real Options (2) Short overview of option pricing theory, followed by applications of option analysis in evaluating complex investment projects by business firms. Prerequisite: B A 502.

FIN 579 Special Topics in Finance (2/4, max. 12) Finance topics of current concern to faculty and students. Offered only when faculty are available and sufficient student interest exists. Seminar content announced in advance of scheduled offerings. Prerequisite: permission of instructor.

FIN 580 Doctoral Seminar in Financial Economics (4) Study of the financing of the corporation, including recent theoretical and institutional developments. Extensive reading and discussion in designated areas covering problems relating to financial management and to the social and economic implications of the financial process. Prerequisite: ECON 500 or permission of instructor.

FIN 590 Doctoral Seminar in Capital Market Theory (4) Decision making under uncertainty, information and capital market efficiency, portfolio theory, capital asset pricing model, arbitrage pricing model, and options pricing model. Prerequisite: ECON 500 or permission of instructor.

FIN 591 Doctoral Seminar in Corporate Finance (4) Principles of intertemporal choice, alternative valuation models, theory of investment under uncertainty, impact of dividend and financing decisions on firm valuation in perfect and imperfect markets, and theory of firm organization and agency costs. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

FIN 592 Doctoral Seminar in Financial Research (4) Empirical research in finance with emphasis on methodology and scientific method. Empirical research in market efficiency, capital asset pricing model, options pricing model, and impact of firm's dividend and financing decisions on firm value. Prerequisite: FIN 590 and BA RM 581 or ECON 582 or permission of instructor.

FIN 599 Doctoral Seminar in Finance (1, max. 12) Study and research in advanced topics of finance. Generally concerned with unpublished areas of research, conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

FIN 600 Independent Study or Research (*, max. 10).

Human Resources Management and Organizational Behavior

HRMOB 499 Undergraduate Research (1-6, max. 9).

Information Systems

I S 310 Fundamentals of Business Information Technologies (4) Exposure to fundamental programming and scripting concepts, conceptual data modeling, database management, and XML. Applying data types and control structures. Continues the concepts of I S 300 of entity-relationship diagrams and record structure diagrams. Database management component includes relational databases, basic SQL, data architecture issues. Prerequisite: I S 300.

I S 320 Fundamentals of Application Programming (4) Fundamental programming concepts including data types, control structures, modularization, and structure programming. Developing solutions for problems in interactive business applications. Introduction to data and file structures. Extensive use of an event-driven programming language. Prerequisite: I S 300; I S 310, which may be taken concurrently; may not be repeated.

I S 423 E-Business System Development (4) Introduces key e-business enabling information technologies. Covers object-oriented principles, representing objects in software, object analysis and design, and use of modern programming language, and advanced database technology for web-based application development. Prerequisite: I S 320; may not be repeated.

I S 410 Business Data Communications (5) Technology and applications of business data communications including characteristics of data, fundamentals of transmission, communications hardware and software, network configurations (LAN, MAN, WAN), management, and security. Laboratory provides hands-on experience with these applications. Prerequisite: I S 300, which may be taken concurrently; may not be repeated.

I S 445 Database Management (4) Examines the business need for database processing. Discusses database design, development, and administration. Students practice real-world database design and implementation using SQL. Discusses issues related to transaction management, data warehouse, etc. Prerequisite: I S 310; I S 320, which may be taken concurrently; may not be repeated.

I S 460 Systems Analysis and Design (4) Analysis and design of business information systems. Concentrates on the analysis phase of systems development. Covers systems development life cycle, feasibility studies, analysis of user requirements, and development of logical system models. Prerequisite: I S 410; I S 445, which may be taken concurrently; may not be repeated.

I S 461 Systems Implementation (4) Develops business information systems integrating knowledge gained in previous 400-level I S courses. Topics include software project management, system/database design, GUI, software testing, systems implementation/support/maintenance, user training, integrating Web, and business environments. Prerequisite: I S 445; I S 460; may not be repeated.

I S 490 Selected Topics in Information Systems (1-6, max. 20) Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: I S 320.

I S 495 Practical Experience in Information Systems (1-4, max. 8) Undergraduate substantive I S internship and mentorship. Internships can be repeated up to two quarters for maximum of 4 credits; grades based on weekly status reports, paper, demonstration of knowledge. Mentorship program (maximum 1 credit/quarter) allows student to be matched with I S executive; grade based on status reports, other participatory events.

I S 499 Undergraduate Research (1-6, max. 12) Selected problems in information systems and computer applications.

I S 504 Computer-Based Information Systems for Management (4) Introduction to information systems and computer technology. Covers concepts of information use in decision making. Use of decision-support problem-solving tools (e.g., spread sheet, database software). Management's responsibility in defining,

developing, using information systems is focal point.

I S 530 Management of Information Systems Resources (4) Topics include general control problem in organizations; performance evaluation of data processing managers; technology and cost trends; software cost estimation; capacity planning; short term utilization; queuing and associated externalities; issues in centralization and decentralization of the information system facilities. Prerequisite: B A 501 or I S 504 or equivalent.

I S 545 Database Systems and Applications (4) Logical data models, relational database systems, structured query language (SQL), conceptual modeling, database design, Web-connected databases, transaction management, distributed and heterogeneous systems, data warehousing, data mining, database administration issues. Focuses on the use/management of business data in areas such as finance. Prerequisite: B A 502 or I S 504.

I S 560 Information Systems Development (4) Offers comprehensive look at information systems development. Covers user requirements analysis, logical and physical system models, system implementation and maintenance, project valuation and management. Additional topics include object-oriented approach, systems development in online environments, and financial information systems. Prerequisite: B A 501 or permission of instructor.

I S 570 Business Data Communications and Networking (4) Networking basics, Internet/Web-based services, client-server architecture, fundamentals of transmission, networking protocols, physical layer, data-link layer, local-area networks, backbone networks, internetworking devices, metropolitan and wide-area networks, wireless networking, network security, network analysis and management. Combines technical, operational, and management issues in data communications. Prerequisite: B A 502 or I S 504.

I S 579 Selected Topics in Information Systems (2/4, max. 12) Topics of current concern to faculty and students. Potential topics include networks and distributed information-processing systems, office automation, artificial intelligence and knowledge-based systems, new approaches to systems development, fourth- and fifth-generation languages, economics of information systems. Prerequisite: B A 501 or I S 504 or permission of instructor.

I S 580 Advanced Research Topics in Information Systems I (4) Overview of research problems and techniques in Information Systems. Focuses on application of microeconomic theories, mathematical, statistical, and operations research methods. Extensive reading and discussion in current and emerging research topics. Prerequisite: doctoral student or permission of instructor.

I S 581 Advanced Research Topics in Information Systems II (4) Advanced topics of current interest of faculty in heterogeneous database, temporal database, data warehousing, data uncertainty, active and deductive database systems, database design, and formal database languages. Prerequisite: doctoral student or permission of instructor.

I S 582 Advanced Research Topics in Information Systems III (4) Potential topics

include formation systems design, software engineering, decision support and expert systems, empirical methods, optimal control theory. Prerequisite: I S 58 or doctoral student or permission of instructor.

I S 599 Doctoral Seminar (1, max. 12) Advanced topics of information systems. Generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

I S 600 Independent Study or Research (*, max. 10).

International Business

I BUS 300 The International Environment of Business (5) Prepares students to understand the most important aspects of the international political economy. Emphasis on the important relationships among nations and business and economic institutions that influence students' performances as managers, consumers, and citizens. Prerequisite: ECON 200.

I BUS 330 Business Environment in Developing Nations (4) The international environment for transnational trade, investment, and operations in the less-developed countries; survey of the economics of underdevelopment; analysis of foreign economic, cultural, and political environments and their impact on international business; foreign investment in the development process; case studies. Prerequisite: I BUS 300; may not be repeated.

I BUS 340 Business Environment in Industrial Countries (4) Factors and conditions affecting business operations and behavior in developed countries, international integration, business relations among nation states and integrated supranational systems, direct investment and multinational industrial activities, analysis of sources and causes of international change. Prerequisite: I BUS 300; may not be repeated.

I BUS 440 Business in Asia (4) Major aspects of the Asian business environment and how Asian enterprises are managed. Problems and opportunities of foreign corporations in Asia. Prerequisite: I BUS 300; may not be repeated.

I BUS 461 Science, Technology, and Innovation Policies in East Asia (5) Role of state and technological change in economic development. Analyzes state and corporate technology policies historically. Basic technology concepts, institutions, and policies in Japan, South Korea, Taiwan, and China. Examines sources of Asia's rise in world of technology and explores whether conditions for its success will continue.

I BUS 462 Japanese Business and Technology (5) Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future. Offered: jointly with SISEA 482.

I BUS 470 Management of International Trade Operations (4) Integrated study of international trade functions, practices, concepts, management, strategy, and policy. The approach utilizes lectures, case studies, research, guest speakers,

and extensive practical application. Prerequisite: I BUS 300.

I BUS 480 Multinational Operations Management (4) Case studies in foreign operations management: planning international objectives and strategies; developing multinational company structures and executives; adapting administrative practices and operating policies to international diversities. Prerequisite: I BUS 300; may not be repeated.

I BUS 490 Special Topics in International Business (1-6, max. 12) Students and faculty focus on current topics of concern. Offered when faculty, student interest, and availability allow. Prerequisite: I BUS 300.

I BUS 491 CISB Track Seminar (1, max. 9) Students meet with business community leaders to discuss international aspects of their companies. Allows for networking and sharing experiences with other students as well as practicing foreign languages. Credit/no credit only.

I BUS 495 International Business Internship (1-4, max. 8) An internship with a company, not-for-profit organization, or government agency in an international business capacity. Credit/no credit only. Prerequisite: I BUS 300. Offered: AWSpS.

I BUS 496 International Business Practicum (4) Offers students opportunity to apply principles, concepts, and skills learned previously to actual business situation. Projects provide students an exposure to the issues and choices facing managers operating in an international business environment. Prerequisite: I BUS 300.

I BUS 499 Undergraduate Research (1-6, max. 9) Prerequisite: I BUS 300.

I BUS 509 Foundations of International Business (2) Introduction to governmental and organizational forces shaping international business. Considers the issues of trade, direct foreign investment, balance of payments, and comparative advantage. Looks at economic policies of governments and multilateral organizations such as WTO, IMF, and World Bank. Prerequisite: permission of School of Business Administration. Offered: Sp.

I BUS 520 International Trade Policy (4) Examines issues important to trade policy. Topics include trade policy basics, tariffs and non-tariff barriers, safeguards, voluntary restraints, dumping, subsidies and strategic trade theory, agricultural trade, developing country rules, regionalism, and services. Prerequisite: B A 500 or course in international economics, trade, or international finance, or permission of graduate office.

I BUS 530 International Business in Less Developed Countries (4) Understanding the economic, sociocultural, and political environment in the less developed countries. Problems of international trade and investment, north-south relations, commodities, technology transfer, foreign aid, and capital flows. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

I BUS 540 International Business in Industrialized Countries (4) Understanding the economic, sociocultural, and political environment in developed, industrialized countries.

Problems of international trade and payments relations, economic integration, national policies, and supranational organizations' impact on managerial environments. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

I BUS 550 International Business Consulting (4) Research, analysis, and report on a specific international business project with an existing organization involved with international trade. Possible tasks include identifying most viable foreign target markets, developing best market entry strategies, establishing international terms and conditions of sale, and completing a preliminary marketing or business plan for clients.

I BUS 560 Multinational Business Management (4) Managerial responses to problems of international business organizations and operations. Strategy formulation in an international context; design and control of multinational organization; adaptation of management systems and policies to different economic, sociocultural, and political environments. Prerequisite: B A 500 or course in international economics or trade or international finance, or permission of graduate office.

I BUS 561 Science, Technology, and Innovation Policies in East Asia (5) Role of state and technological change in economic development. Analyzes state and corporate policies historically. Technology concepts, institutions, and policies in Japan, South Korea, Taiwan, and China. Examines sources of Asia's rise in world of technology and explores conditions for its successful continuation. Offered: jointly with SISEA 581.

I BUS 562 Japanese Business and Technology (5) Examination of Japan's postwar enterprise system in its historical context. Topics include corporate and financial structure, production and distribution, trade and investment policies, government-business relations, system of innovation, technological developments, prospects for the future. Offered: jointly with SISEA 582.

I BUS 570 International Study Tour (2) Educational international study tour. Includes pre-tour and post-tour activities. Prerequisite: B A 502 and permission of School of Business Administration.

I BUS 572 Cross-Cultural Conversations on Contemporary Issues (1, max. 4) Creates opportunities for students from across the globe to share information and perspectives on contemporary issues important to international business. In weekly, facilitated, small-group conversations, students improve their ability to formulate and express ideas and opinions, and practice persuasion and facilitation skills. Credit/no credit only.

I BUS 575 Business Studies Abroad (*, max. 24) Research and study of foreign business problems in the country or countries where the firms are located. Limited to students who have the approval of their major adviser and a faculty member who has agreed to direct their work in accordance with a definite program of studies. Credit/no credit only.

I BUS 579 Seminar: Special Topics in International Business (2/4, max. 12) Application of international business principles to

the analysis of a specific issue in trade or resource transfer, or to the business conditions in a particular country. Japan and other Pacific Rim countries are frequent topics. Prerequisite: B A 500 or permission of instructor.

I BUS 600 Independent Study or Research (*, max. 10)

Management

MGMT 200 Introduction to Law (5) I&S Legal institutions and processes; law as a system of social thought and behavior and a frame of order within which rival claims are resolved and compromised; legal reasoning; law as a process of protecting and facilitating voluntary arrangements in a business society. Offered: AWSp.

MGMT 300 Managing for Organizational Effectiveness (4) Organizational behavior and organization theory concepts show how managers can improve organizational effectiveness by attending to the human side of the enterprise. Topics such as leadership, motivation, power and politics, and organization design are examined for their effects on performance. Offered: AWSpS.

MGMT 311 Managing Human Resources (4) The personnel/industrial relations function from a managerial perspective. Selection, compensation, performance appraisal, and training and development. Special emphasis on union-management relations and relevant behavior science research.

MGMT 312 Career Development Workshop (2) Develops career goals in business administration and guides students toward the academic training that achieves their goals. Emphasizes development of the personal skills necessary to market yourself in a competitive marketplace and present yourself to potential employers.

MGMT 320 Business, Government, and Society (4) Political, social, and legal environment of business. Critical managerial issues from historical, theoretical, ethical perspectives; their impact on organization. Corporate political power, boards of directors, capitalism, industrial policy, business ethics and social responsibility, alternative corporate roles in society. Offered: AWSp.

MGMT 321 Legal and Regulatory Environment of Business (4) Managerial implications of restrictions imposed by government on corporations from legal point of view. Constitutional law impacting business managers; antitrust, administrative, and regulatory issues; environmental law, product liability law, and securities law. Not a business or commercial law course.

MGMT 322 Inventing Modern Capitalism (4) Business-government relationships in American history, with aim of defining and explaining patterns in attitudes and behavior rather than detailing events. Discussions organized in terms of policy areas (e.g., national banking, transportation, agriculture, energy, industry in wartime, trade, and research).

MGMT 323 Business Ethics and Corporate Social Responsibility (4) Philosophical and pragmatic perspectives, including values and social/ethical premises in organizational decision making. Several issues covered in depth; investments abroad, hazardous products, bribery, industry practices, and others.

MGMT 401 Leadership, Critical Thinking, and Decision Making (4) The manager as leader and decision maker. Various leadership theories, styles, and behaviors. Decision-making models and techniques.

MGMT 402 Deal-Making and Negotiations (4) The art and science of negotiations with the goal of making students more effective negotiators in a variety of business situations, such as budget negotiations, buying and selling, contracts, and merger negotiations. Concept and skill development.

MGMT 403 Motivating High Performance (4) Various strategies for influencing employee motivation and performance. Reward systems, goal-setting procedures, and various techniques to enlarge and enrich ones job. Effects of these formal and informal strategies on job attitudes.

MGMT 404 Organization Development and Change (4) Provides a conceptual understanding of organization development theory, practice, and research. Organization development is an umbrella term for a collection of behavioral science techniques for increasing individual, group, and organizational effectiveness.

MGMT 411 Recruiting and Hiring Talent (4) Affirmative action, recruitment, testing, interviewing, placement, promotion, and overall human resource planning. Prerequisite: MGMT 311.

MGMT 412 Performance Appraisal and Compensation (4) The various kinds of systems used by organizations to evaluate and reward employee performance. Job analysis, job evaluation, setting performance standards, giving appraisal feedback, designing incentive systems, administering a salary plan. Prerequisite: MGMT 311.

MGMT 413 Labor Law and Collective Bargaining (4) Labor-management relations. The legal context, union organizing, grievance administration, collective bargaining. Individual and group simulations used.

MGMT 421 Commercial Law (5) Principles of the law of contracts, agency, property, sales, negotiable instruments, and security transactions. Prerequisite: O E 200 or MGMT 200.

MGMT 422 Protecting Intellectual Property in a Global Economy (2) Provides instruction to help people who are not lawyers and who are starting new companies recognize, protect, develop, and manage intellectual property in a global economy. Assists managers of more mature firms better understand the intellectual property protection process. Includes topics related to e-commerce.

MGMT 430 Business Policy (4) Policy making and administration from a general management point of view. Emphasis is on problem analysis, the decision-making process, administration and control, and continuous reappraisal of policies and objectives. Integrates and builds upon the work of the core curriculum. Prerequisite: FIN 350; MKTG 301; either HROB 300 or MGMT 300; recommended: OPMGT 301. Offered: A/W/Sp.

MGMT 490 Special Topics in Management (1-6, max. 6) Topics of current interest to faculty and students. Offered when allowed by faculty availability and sufficient student interest. Content announced in advance of scheduled offerings.

MGMT 495 Management Internship (1-4, max. 8) Internship with a private firm, nonprofit organization or government agency, where work experience involves substantial application of management concepts learned in classroom. Credit/no credit only. Prerequisite: MGMT 300.

MGMT 500 Management and Leadership (4) Behavioral aspects of management with emphasis on leadership, motivation, and decision making. May include communication, conflict management, group dynamics, and organizational change.

MGMT 502 Business Strategy (4) Policy decisions and strategic leadership from the general management point of view. Determination of corporate product-service objectives, development of a network of internal operating policies and methods to achieve objectives at a cost satisfactory to the consumer and to society. Prerequisite: all first-year required courses in MBA curriculum.

MGMT 505 Business Ethics (2) Business organization's political, social and legal environments. Critical managerial issues from historical, theoretical, and social/ethical perspectives. Corporate political power, corporate boards of directors, industrial power, social responsibility, business ethics, roles of the corporation in society, themes of change.

MGMT 510 Professional Development (0-2, max. 2) Assessment, instruction, and coaching to develop students' professional skills. Topics include written and oral presentation skills, conflict resolution, team-building, collaboration, and intercultural communication.

MGMT 511 Leadership and Coaching Practicum (2, max. 4) Gives Leadership Fellows a venue to analyze and assess their coaching activities with first-year MBA student teams, receive feedback from the instructor and their fellow coaches, discuss readings on leadership, coaching, collaboration, and communication, and hear guest speakers on related topics. Credit/no credit only.

MGMT 520 Designing a Corporate Strategy (4) Addresses the broad question: what business(es) should we compete in? Focuses on decisions related to an appropriate level of diversification and the means by which that diversification is implemented. Includes the following issues: mergers and acquisitions, strategic alliances, joint ventures, LBOs, and spin-offs.

MGMT 521 Strategic Management of Technology and Innovation (4) *Dooley, Steensma* Examines how innovative firms often experience rapid and disruptive levels of growth and change and how without effective management of new technologies, the boom can quickly turn to bust. Investigates the micro-economic drivers of competition in technology industries, explores how technological change affects competition, and examines the implications for competitive strategy. Offered: W/Sp.

MGMT 523 Business Ethics in a High Technology Environment (4) Examines business ethics from philosophical, theoretical, and pragmatic perspectives. Explores ethical theory and values in business. Attempts to place ethical concepts into a framework useful to practicing managers. Places emphasis on the ethical implications of rapidly changing hi-tech environments such as e-commerce and biotech.

MGMT 526 Competing in the Global Economy (4) *Dewenter, Steensma* Examines the global environment for business and the challenges facing managers in this environment. Explores the implications of the common phrase "think globally — act locally." Offered: jointly with B ECON 526; W/Sp.

MGMT 530 Entrepreneurship (4) Entrepreneurship, both in the form of (1) establishment of new independent businesses owned largely by those who manage them and (2) initiation of new enterprises having exceptional autonomy within larger organizations that finance and own them. Basic knowledge in accounting, marketing, and finance is assumed.

MGMT 531 Managing Intellectual Property Rights (4) Comprehensive analysis of the issues pertinent to the various forms of intellectual property, including how to recognize, develop, maintain, and capitalize on them.

MGMT 540 Managing Human Capital (4) Covers principles and techniques for recruiting, selecting, and developing employees, appraising their performance, and rewarding their contributions. Explores key topics primarily through case studies, readings, class discussion, and fieldwork. Reviews legal and regulatory issues that surround these methods. Intended for both general managers and human resource professionals.

MGMT 544 Managing Effectively Across Cultures (4) *Chen* Examines how, with increasing globalization of business, employees at all levels of corporations often work and interact with people from different nations, cultures, and how they need an understanding of cross-cultural management and challenges of international settings. Focuses on international organizational behavior and international human resource issues, practices. Offered: W.

MGMT 545 Leading and Managing High-Performance Organizations (4) Focuses on the nature and function of effective leadership in high-performance systems. Includes visionary and transformational leadership, decision-making and empowerment, power and influence in organizations desiring flexibility and innovation, and leading organizational change. Places emphasis on leadership of emerging forms of organization such as learning organizations, virtual organizations, and networks.

MGMT 546 High Involvement Employees (4) Focuses on two domains: (1) how managers can lead and motivate their people; and (2) how actual organizations, particularly high technology and entrepreneurial firms, employ these strategies. Specific topics include commitment, involvement, enthusiasm, effort, participation, citizenship, and performance. Student teams investigate how local companies utilize these ideas.

MGMT 547 Successful Negotiations (2) Focuses on a broad array of conflict resolution skills needed for effective management in a constantly changing business environment. Examines methods of conflict resolution — bargaining, distributive and integrative negotiation, mediation, and arbitration. Applies these tools to managerial challenges such as employment contracts, buyer-seller agreements, and mediated and arbitrated agreements.

MGMT 548 Dealmaking in High Velocity Ventures (2) Focuses on negotiations in

ventures that lack conventional customers, suppliers, employees, joint-venture partners, strategic allies, and money. Analyzes negotiations with early potential customers and essential suppliers, sources of funding (e.g., "angels" and venture capitalists), critical partners and/or strategic allies (including established firms), and key employees. Prerequisite: MGMT 547.

MGMT 549 Dealmaking in the Global Arena (2) For students who expect to engage in significant international business negotiations. Includes deal-structuring skills needed in a range of cross-border transactions and relationships. Individual segments develop broad analytical themes, cross-cultural dimensions, and distinctive national approaches to corporate governance and their impact on negotiating strategy. Prerequisite: MGMT 547.

MGMT 579 Special Topics in Management (2/4, max. 12) In-depth study and research on topics of special interest to faculty members and students in the fields of human resources management, organizational behavior, and strategic management. Offered on an ad hoc basis. Content announced before scheduled offering.

MGMT 580 The Individual and the Organization (4) Focuses on attributes the individual brings to the organization. Covers important performance-related processes such as learning, motivation, and decision-making as well as an understanding of personal attitudes and personality traits.

MGMT 581 Power, Influence, and Citizenship Behavior (4) Focuses on ways in which the individual and the organization get things done through working with others. Includes leadership, social influence, and the use and abuse of power, with attention given to positive organizational activities such as citizenship behavior and extra role activities.

MGMT 582 Organization Entry, Training, and Exit (4) Focuses on the systems, processes, and experiences that newcomers to organizations undergo. Covers staffing, employee selection, training, socialization, and attachment.

MGMT 583 Contemporary Research in Organizational Behavior (4) Focuses on importance of group processes for organizational effectiveness. Covers concepts of group dynamics including interpersonal communication, role and norm development, and group decision making as well as organizational processes such as team development and organizational culture.

MGMT 584 Contemporary Research in Human Resource Management (4) Focuses on the organization's employee performance appraisal and compensation systems. Examines effects of different practices.

MGMT 590 Economic Foundations of Strategic Management (4) Reviews the economic theories that support strategies pursued by firms and explores the links between market processes, firm strategy, and firm performance. Topics include agency theory, transaction cost economics, resource dependence, population ecology, and neo-Austrian economics.

MGMT 591 Sociological Foundations of Strategic Management (4) Explores the sociology of organizations from multiple perspectives while introducing fundamental sociological questions and preparing students for

conducting research in organizations. Emphasis on structural contingencies, institutions, resource dependence, population ecology, negotiated order and culture, organizational learning and decision making, organizational power and politics, networks, and inter-organizational relations.

MGMT 592 Contemporary Strategic Management Research (4) Facilitates understanding of empirical foundations of theory development and testing in contemporary strategic management research. Focuses on evaluation of ways in which the empirical tradition has evolved in the strategic management area. Attention to evaluating research methodologies used in the field.

MGMT 593 Special Topics in Strategic Management I (4)

MGMT 594 Special Topics in Strategic Management II (4) Focuses on the social and political factors that help shape corporate strategy using stakeholder management as an integrating concept. Topics include corporate governance, corporate political activity, governmental regulation, comparative political economy, and normative aspects of strategic management, including ethics and corporate social responsibility.

MGMT 599 Doctoral Seminar in Management (1, max. 12) Advanced topics in the fields of human resources management and organizational behavior. May be used by visiting faculty members to present topics of interest to students.

MGMT 600 Independent Study or Research (*, max. 12).

Marketing

MKTG 301 Marketing Concepts (4) Tools, factors, and concepts used by management in planning, establishing policies, and solving marketing problems. Marketing concepts, consumer demand and behavior, location analysis, marketing, functions, institutions, channels, prices, and public policy. Prerequisite: ECON 200.

MKTG 335 Principles of Selling (4) Focuses on selling from salesperson's perspective, role of persuasion in professional selling and other organizational settings. In addition to coursework in such areas as consumer behavior, negotiation, and communication, students practice sales skills in role plays, presentations, and other exercises requiring practical application of selling theory. Prerequisite: MKTG 301.

MKTG 340 Advertising (4) Management of the advertising function and its integration with other forms of promotion. Planning the program, determining the most effective approach, evaluation of media and budget, advertising research, advertising institutions, economic and social aspects. Prerequisite: MKTG 301; may not be repeated.

MKTG 370 Retailing (4) Profit planning and business control; buying, stock control, pricing, promotion; store location, layout, organization, policies, systems; coordination of store activities. Prerequisite: MKTG 301; may not be repeated.

MKTG 410 Product Management (4) Important aspects of product planning and development,

concept testing, product-life cycle, portfolio analysis, targeting and positioning, branding issues, product-line extension, pricing policies, and implementing product decisions. Computer simulation project provides practice for implementing product strategies. Prerequisite: MKTG 301; may not be repeated.

MKTG 430 Sales Force Management (4) Focuses on the role of the sales manager within the organization. Includes distribution planning, sales organization, management of the sales force, methods of sales, cost and financial analysis, and performance analysis. Prerequisite: MKTG 301; may not be repeated.

MKTG 445 Multicultural Marketing and Business Development (4) Integrates tools from marketing, consulting, and multi-cultural business management to provide consulting services to small business in economically-distressed communities. Working in teams with assistance from industry mentors and alumni from the course, students gain practical experience in multi-cultural marketing, consulting, and managing a business. Prerequisite: MKTG 301.

MKTG 450 Consumer Behavior (4) Theory and practice pertinent to marketing decisions; utilization of theories from behavioral sciences in marketing research; theories of fashion, characteristics of goods, shopping behavior, product differentiation, market segmentation, and opinion leadership; application of concepts to management of advertising, personal selling, pricing, and channels of distribution. Prerequisite: MKTG 301; may not be repeated.

MKTG 455 Entrepreneurial Marketing (4) Examines the skills and tools entrepreneurs need for bootstrap marketing in their start-up firms. Students learn to identify target market segments, position their products, estimate demand, set prices, gain access to channels, and manage the issues of rapid growth. Prerequisite: MKTG 301; may not be repeated.

MKTG 460 Marketing Research (4) Examines marketing research process; steps of research design, questionnaire construction, sampling, data analysis, evaluation/presentation of findings, online research, and web surveys. Class project provides practical application. Prerequisite: MKTG 301; either ECON 311, QMETH 201, STAT 220, STAT 301, STAT 311, or STAT 390; may not be repeated.

MKTG 465 Marketing Data: Measurement and Analysis (4) Tools for aiding market segmentation, positioning, product design, and demand analysis. Examines multidimensional scaling, conjoint analysis, factor analysis, cluster analysis, discriminant analysis, multiple regression, logistic regression, and decision trees. Emphasis on applications of practical marketing problems and using statistical packages. Prerequisite: MKTG 301; may not be repeated.

MKTG 470 International Marketing (4) Focuses on assessing international marketing opportunities, formulating and implementing international marketing strategies. Examines how to use marketing analyses and deductive decision modeling in assessing international marketing opportunities. Uses marketing tools and concepts in the planning, preparation, and presentation and discussion of cases and class project. Prerequisite: MKTG 301; may not be repeated.

MKTG 475 Retail Strategy: Internet and Global Dimensions (4) Explores how owners and top managers of retail firms analyze and solve problems, design, implement, and evaluate strategies and other wise manage for competitive advantage. Utilizes cases, readings, and writing assignments as the main tools for teaching and learning. Prerequisite: MKTG 370; may not be repeated.

MKTG 477 Merchandise Acquisition and Management (4) Integration of summer internship experiences with discussion of merchandise acquisition. Includes retail inventory management system, processes of planning and buying merchandise, private label and imported goods, and relevant personnel management area. Centers on major project done for and with company buying staff. Prerequisite: MKTG 301; MKTG 370; MKTG 495. Offered: A.

MKTG 478 Retail Merchandising and Design Management (4) Second of capstone seminars includes integration of summer internship experiences with customer service, customer communications, merchandise presentation, and leadership skills. Visit local retailers to observe visual presentations, prepare design plan for store, and examine management styles to determine philosophy for employees, and provide customer service. Prerequisite: MKTG 301; MKTG 370; MKTG 495. Offered: W.

MKTG 480 Advanced Marketing Management (4) Capstone course connecting principles, tools, and elements of multiple marketing disciplines to a manager's perspective and responsibilities in today's company. Emphasizes strategy, analysis, and problem solving. Analyzes marketing problems using conceptual and quantitative tools utilized in marketing decision making. Prerequisite: MKTG 301; MKG 450; MKTG 460; may not be repeated.

MKTG 485 Strategic Market Management (4) Utilize cases and/or projects to examine strategic market-based management. Analyze marketing situations to identify market trends and understand consumer and competitor behavior. Develop and justify appropriate course of action to address marketing problems and opportunities in terms of product planning, distribution channels, pricing, and promotion. Prerequisite: MKTG 301.

MKTG 490 Special Topics and Issues in Marketing (1-6, max. 12) Contemporary topics and issues in marketing: marketing in nonprofit organizations, marketing of services, marketing in the public sector, and marketing in an economy of scarcity. Ordinarily only one topic area is addressed in any one quarter. Course content reflects contemporary developments and the current interests of instructors and students. Prerequisite: MKTG 301.

MKTG 495 Marketing Internship (1-4, max. 8) An internship with a company, not for profit organization, or government agency in a marketing capacity. Prerequisite: MKTG 301.

MKTG 496 Marketing Practicum (4) *Rhodes* Offers opportunities to apply principles, concepts, and skills learned previously to actual business situations. Participation in class part-time and in an internship with a business employer part-time. Prerequisite: MKTG 301.

MKTG 499 Undergraduate Research (1-6, max. 9) Prerequisite: MKTG 301.

MKTG 501 Marketing Management (4) Analysis and management of customer satisfaction in goods and services markets by profit and nonprofit organizations. Buyer behavior, market segmentation and product positioning, product policy, pricing, distribution, sales force and advertising management, and market research in the contexts of strategy development, decision making, implementation, and control.

MKTG 509 Foundations of Marketing Analysis (2) Examines analytical and statistical methods useful in strategic decision making in marketing. A dynamic computer simulation activity allows students to develop and receive feedback on competitive marketing strategies. Prerequisite: either B A 501 or MKTG 501. Offered: Sp.

MKTG 510 New Product Development (4) Integrates business, design, and engineering functions in the presentation and application of structures, tools, and methodologies important for successful new product development. New product development projects are accomplished with a cross-functional team emphasis. Prerequisite: B A 501.

MKTG 511 Business-to-Business Marketing (4) Integrated approach to product marketing management in the business-to-business marketplace. Analysis of core competencies, competitive environment, positioning and segmentation strategies, cost structure, and customer satisfaction. Case-based and project-oriented approach to studying marketing management in the business-to-business market. Prerequisite: B A 501 or permission of instructor.

MKTG 512 Consumer Marketing and Brand Management (4) Analysis of marketing strategies for consumer products and services. Focuses on consumer satisfaction and brand management including product line and brand developments, pricing strategies, channel and retail relationships, and marketing communication strategies for consumer goods and services. Prerequisite: B A 501.

MKTG 520 Marketing Channels (4) Channels of distribution decisions for goods and services in profit and nonprofit organizations. Considers methods of optimizing the number, quality of institutions and activities employed in dealing with exchange, and space and time aspects of channel management. Relates management of marketing channels to marketing mix, organizational objectives. Prerequisite: B A 501.

MKTG 530 Managing the Sales System (4) Examines the revenue generation function of a firm from a system-wide perspective. Topics include strategic and tactical considerations related to customer acquisition and retention, end-to-end sales and support operations, strategic partnerships, and continuous performance monitoring. Emphasis on case studies and team projects. Prerequisite: B A 501.

MKTG 540 Advertising and Promotion Management (4) Management of advertising and promotional activities and their integration with other elements of the marketing mix. Topics include: understanding the communication process, analyzing markets, working with suppliers, establishing objectives, determining budgets, selecting media, measuring and evaluating effectiveness, using publicity and promotions. Legal, social, and economic consequences are considered. Prerequisite: B A 501.

MKTG 550 Managing Customer Relationships Through Direct Marketing (4) Management of customer relationships through the lens of direct marketing. Topics include direct marketing creative activity, strategy, and execution; media and segmentation; direct marketing budgeting and financials; targeting, database, and predictive modeling; catalogue marketing; relationship marketing; business-to-business complex sales; privacy. Prerequisite: B A 501.

MKTG 555 Entrepreneurial Marketing and Management (4) Examines the skills and tools entrepreneurs need for bootstrap marketing in their firms. Covers how to target market segments, position products, estimate demand, set prices, gain access to channels, and manage issues of rapid growth. Prerequisite: B A 501.

MKTG 560 Research for Marketing Decisions (4) Methods and applications of marketing research to solve marketing problems. Deals with: problem definition, research design, questionnaire construction, sampling, and data analysis using SPSS. Introduces promising new developments in online research, web surveys, and data analysis. Class research project provides practical application. Prerequisite: B A 501.

MKTG 565 Database Marketing and Decision Models (4) Examines methodologies that are useful for analyzing customer databases. Presents models that can be applied in the analysis of marketing problems and the support of marketing decisions. Prerequisite: B A 501.

MKTG 570 International Marketing (4) Analysis of the marketing strategies and tactics of multinational corporations. Choice of entry strategies for foreign markets, analyzing international competition at home and abroad, and developing global marketing strategies. Prerequisite: B A 501; recommended: one I BUS course.

MKTG 575 Marketing High-Technology Products (4) Management of the marketing requirements of high-technology products. Examines how markets for high-tech products involve shortened product life cycles, demand for continual product updates, perceived risk of adoption by customers, requirements for intensive customer service and relationships, and growing reliance on business partners. Prerequisite: B A 501.

MKTG 579 Special Topics in Marketing (2/4, max. 12) Marketing topics of current concern to faculty and students. Offered only when allowed by faculty availability and sufficient student interest. Seminar content to be announced in advance of scheduled offerings. Prerequisite: B A 501.

MKTG 581 Doctoral Seminar in Consumer Behavior (4) *Louie, Yalch* Survey of the field of consumer behavior introduces fundamental topics in consumer behavior including cognitive processes, emotion, and consumer satisfaction. Provides exposure to a variety of research methods including experiments, surveys, and phenomenological research.

MKTG 582 Doctoral Seminar in Multivariate Analysis for Marketing Research (4) *MacLachlan, Moinpour* Survey of methods useful for empirical evaluation of multivariate marketing phenomena and relationships. Includes an overview of measurement theory and practice; multidimensional scaling; conjoint analysis;

cluster, factor, and discriminant analyses; multivariate analysis of variance; structural equation modeling; and other methods commonly encountered in academic marketing research.

MKTG 583 Doctoral Seminar in Marketing Strategy (4) *Jacobson, Song* Study of factors influencing business performance and role of marketing in achieving competitive advantage. Analysis of prevailing, and emerging, theories underlying strategic thinking and competitive process. Examination of empirical research regarding measurement, level, and persistence of business success and implications of findings for theory and strategy development. Prerequisite: BA RM 580.

MKTG 584 Doctoral Seminar in Research Issues in Marketing (4) Examination of research problems and issues in marketing. Specific topics vary depending on the interest of faculty and students.

MKTG 591 Doctoral Seminar in Consumer Behavior Research Topics (4) *Louie, Yalch* Investigates research topics of current interest in consumer behavior. Considers the processes used by consumers to acquire and evaluate marketing information including advertising, publicity, word of mouth, packaging, product description, price, and retail outlets, and examines ways the principles in social perception influence consumers' individual responses to marketing-related activities.

MKTG 593 Doctoral Seminar in Marketing Models (4) *Erickson* Focuses on modeling research efforts in various areas of marketing. Discussion of mathematical and statistical modeling approaches which contribute to scientific development in the marketing area and ways in which modeling is used to characterize and summarize the nature of general marketing situations in complex environments.

MKTG 599 Doctoral Seminar in Marketing (1, max. 12) Study and research in advanced topics of marketing. The seminar is generally concerned with unpublished areas of research and conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

MKTG 600 Independent Study or Research (*, max. 10) .

Operations Management

OPMGT 402 Introduction to Logistics (4) Logistics studies of the efficient delivery of goods and services. A total-cost approach recognizes this involves not only the obvious vehicle-routing issues but also shipment size and mix, warehouse location, product design, and customer services. Includes study of real companies' logistics problems. Prerequisite: OPMGT 301.

OPMGT 443 Inventory and Supply Chain Management (4) Use of material and supply chain management in manufacturing and service organizations to reduce inventory levels while providing adequate service to customers. Specific topics include forecasting, Just-in-Time production, deterministic and stochastic inventory models, and material requirements planning (MRP). Prerequisite: OPMGT 301.

OPMGT 450 Introduction to Project Management (4) Focuses on the management of complex projects and the tools and techniques

which have been developed in the past 25 years to assist managers with such projects. The course covers all elements of project planning, scheduling and control as well as implementation and organizational issues. Prerequisite: OPMGT 301.

OPMGT 461 Business of Process Design (4) Examines systems theory, project design, and strategic decision-making in a teaming environment. Provides a unique opportunity to get involved with real-life design problems in the chemical and aeronautical industries. Prerequisite: OPMGT 301.

OPMGT 490 Special Topics in Operations Management (1-6, max. 20) Operations management topics of current concern to faculty and students. Potential topics are: logistics management, project scheduling, manufacturing strategy, site and location analysis, management of service operations. Prerequisite: OPMGT 301.

OPMGT 495 Operations Management Internship (1-4, max. 8) Internship with a private firm, nonprofit organization, or government agency, where work experience involves substantial application of analysis techniques and management concepts learned in classroom. Credit/no credit only. Prerequisite: OPMGT 301.

OPMGT 499 Undergraduate Research (1-6, max. 9) .

OPMGT 502 Introduction to Operations Management (4) Managerial decision making in operations problems, including application of quantitative analysis and use of computers. Production of goods or services in any type of organization. Inventory management, scheduling, facility location, management of service systems, and quality assurance. Prerequisite: QMETH 500.

OPMGT 535 Global Logistics Management (4) Provides an overview of the concepts and substance of trade, transportation, and logistics. Deals with management of physical, documentation, and information flows within supply chains, including purchasing, distribution, intermodal transportation, ERP ecommerce and e-fulfillment, financial transactions, and regulations. Prerequisite: permission of instructor. Offered: jointly with GTTL 501; AW.

OPMGT 536 Seminar in Global Trade, Transportation, and Logistics (4) Interdisciplinary seminar that brings together students with academics and practitioners at the forefront of trade, transportation, and logistics in discussions of selected topics. Additionally, students research issues of special interest. Prerequisite: OPMGT 535, GTTL 501, or permission of instructor. Offered: jointly with GTTL 502; Sp.

OPMGT 550 Project Management (4) Management of complex projects, and tools and techniques (e.g., CPM and PERT) developed to aid the planning, scheduling, and control of projects. Includes work breakdown structures, precedence networks, Gantt charts, resource leveling and allocation, and the use of microcomputer programs. Prerequisite: B A 502 or OPMGT 502 or equivalent.

OPMGT 570 Operations Strategy (4) Strategic management of operations and manufacturing in domestic and international companies. Developing and implementing a coherent strategy based on continuous improvement of quality, productivity, products, processes, and

customer services. Facilities, capacity, process/work-force planning, organization, people, systems integration, coordination between operations, marketing, engineering, and R&D. Prerequisite: B A 502 or OPMGT 502 or equivalent.

OPMGT 579 Special Topics in Operations Management (2/4, max. 12) Major topics in operations management and systems analysis. Emphasis on research and, where appropriate, application of quantitative analysis and computers. Topics vary, including workforce planning, project management, research and development management, quality assurance, technology planning and forecasting, systems analysis of complex organizations, and urban systems analysis. Prerequisite: B A 502.

OPMGT 584 Fundamentals of Operations Management Research (4) *Klastorin* Surveys basic areas that form the foundations for much of the research in operations management today. Topic areas include facility location, scheduling, project management, and supply chain management. Prerequisite: QMETH 580. Offered: W.

OPMGT 587 Advanced Topics in Inventory Management (4) Survey of literature in inventory/production control with emphasis on current research. Topics include single-echelon deterministic and probabilistic models and multi-echelon stochastic models. Prerequisite: QMETH 592 and course in probability theory and in stochastic processes.

OPMGT 599 Doctoral Seminar in Operations Management (1, max. 12) Study and research in advanced topics of operations management. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status.

OPMGT 600 Independent Study or Research (*, max. 10) .

Organization and Environment

O E 499 Undergraduate Research (1-6, max. 9) Selected problem areas or issues in consultation among faculty members and students. Prerequisite: permission of the undergraduate office.

Quantitative Methods

QMETH 450 Spreadsheet Models for Managerial Decision Making (4) Formulation and solution of business problems using operations research techniques in a spreadsheet environment. Techniques of linear and integer programming, decision analysis, network optimization, queuing, and simulation. Applications from marketing, finance, and operations. Prerequisite: I S 300.

QMETH 490 Special Problems in Quantitative Analysis (1-6, max. 20) Specialized quantitative techniques useful for solving business problems. Topics from operation research, statistics, computer methods. Emphasis on application. Prerequisite: either ECON 311, QMETH 201, PSYCH 213, PSYCH 218, STAT 220, STAT 301, STAT 311, or STAT 390.

QMETH 499 Undergraduate Research (1-6, max. 9) Research in selected problems in

business statistics, operations research, decision theory, and computer applications.

QMETH 500 Statistical Data Analysis for Management (2) Statistical models, techniques, and tools for aiding management decisions. Use of spreadsheets in basic business problems. Probability distributions, random sampling and standard errors, hypothesis testing, multiple regression, ANOVA, chi-square tests. Prerequisite: preparation in elementary calculus and successful completion of university-administered proficiency exam.

QMETH 501 Decision Support Models (2) Introduction to computer-based modeling techniques for management decision making. Linear programming, decision analysis, and simulation. Formulation and interpretation. Prerequisite: QMETH 500.

QMETH 503 Practical Methods for Data Analysis (4) Presentation of basic exploratory data analysis with business examples. Data summaries, multivariate data, time series, multiway tables. Techniques include graphical display, transformation, outlier identification, cluster analysis, smoothing, regression, robustness. Prerequisite: B A 500 or equivalent or permission of instructor. Offered: jointly with STAT 503.

QMETH 520 Managerial Applications of Regression Models (4) Data exploration and inference using regression models for business forecasting and management. Models include simple, multiple, logistic, and nonlinear regression, use of dummy variables, transformations, variable selection, and diagnostics. Prerequisite: QMETH 500 or B A 500.

QMETH 528 Survey Sampling Applications (4) Introduction to design and implementation of sample surveys with emphasis on business applications. Simple random, stratified, cluster, multistage sample methods. Probability sampling, optimal allocation of sampling units. Mail, telephone, interview methods. Estimation methods, Questionnaire design. Non-response. Prerequisite: QMETH 500 or B A 500 or equivalent or permission of instructor.

QMETH 530 Forecasting Models in Business (4) Introduction to time series analysis and forecasting. Topics include seasonal adjustment, decomposition, exponential smoothing, moving average, and autoregression as well as model identification, estimation, diagnostics, and adaptive forecasting illustrations using real data. Prerequisite: QMETH 500 or B A 500.

QMETH 551 Modeling with Spreadsheets (4) Advanced formulation and modeling of business problems in a spreadsheet environment. Techniques of linear, integer, and nonlinear

programming, multi-objective goal programming, and simulation. Applications from finance, marketing, and operations. Prerequisite: B A 502 or QMETH 501 or equivalent.

QMETH 579 Special Topics in Quantitative Methods (2/4, max. 12) Presentation of topics of current concern to students and faculty in operations research and applied business statistics. Potential topics include applications and extensions of mathematical programming, stochastic processes, discrete programming, networks models, and the application of statistical techniques.

QMETH 580 Mathematical Programming (4) Advanced survey of mathematical programming with applications to business problems. Includes linear, integer, stochastic, nonlinear, and dynamic programming and network optimization. Treatment includes formulation, optimality conditions, duality theory, solution algorithms. Applications to production, scheduling, marketing, finance, and equipment replacement. Prerequisite: B A 501 or equivalent and doctoral student or permission of instructor.

QMETH 592 Stochastic Models: Queuing and Simulation (4) Application of stochastic processes to business problems. Focuses on development and application of queuing theory and discrete event simulation. Prerequisite: stochastic processes, knowledge of high level programming language, and doctoral student or permission of instructor.

QMETH 599 Doctoral Seminar in Operations Research (1, max. 12) Study and research in advanced topics of operations research. The seminar is generally concerned with unpublished areas of research and is conducted by visiting professors and departmental faculty. Prerequisite: doctoral student status. Credit/no credit only.

QMETH 600 Independent Study or Research (*).

Technology Management MBA

TMMBA 500 Overview of Technology and Teamwork (1) *Bigley, Sundem* Residential session to explore teamwork and managerial effectiveness, communication skills, and the high technology industries on which the Technology Management MBA program focuses. Prerequisite: permission of School of Business Administration. Credit/no credit only.

TMMBA 501 Competitive Analysis for Technology Managers (5) *Boeker, Hill* Examines the nature of the competitive process

and the source of firm-level competitive advantage. Explores the economics of market competition and the strategies firms use to gain competitive advantage. Explores fundamental micro-economic principles of competition, and applies them to the study of competitive advantage and strategy. Prerequisite: Permission of School of Business Administration.

TMMBA 502 Financial Reporting and Analysis (4) *Bowen, Sefcik* Financial accounting information in technology companies from a management perspective. Topics include use of financial statements by managers, investors, financial analysts, and other firm stakeholders; measurement and reporting of assets, equities, income; analysis of financial ratios; and comparisons of financial performance across companies. Prerequisite: Permission of School of Business Administration.

TMMBA 503 Analysis of Data (2) *Siegel, Tamura* An introduction to statistical techniques useful for management decision-making, with analysis of problems using spreadsheet programs. Topics include visualization and summarization of data and variability; confidence intervals and hypothesis testing; and prediction using multiple regression and time series analysis. Prerequisite: Permission of School of Business Administration.

TMMBA 505 Marketing High-Tech Products and Services (4) *Dodson, Schlosser* Fundamentals of marketing analysis in the context of technology-based products and services. Topics include development of a marketing strategy, customer and competitor analyses, and marketing research. Prerequisite: Permission of School of Business Administration.

TMMBA 506 Capital Markets, Security Valuation, and Risk Management (4) *Kamara, Karpoff* Basic paradigms of modern financial theory, especially portfolio theory, asset pricing theory and financial derivatives. Includes construction of optimal portfolios, measuring risk of securities, the relations between risks and returns, the pricing and use of futures and options contracts. Prerequisite: Permission of School of Business Administration.

TMMBA 507 Analysis of Domestic and International Economic Conditions (4) *Hadjimichalakis, Hess* Examines economy-wide markets: markets for goods and services; money, bond and stock markets; foreign exchange markets; and markets for labor and other inputs. Includes interactions among markets to explain movements in output, interest rates, exchange rates, price levels and wages, foreign trade, and foreign investments. Prerequisite: Permission of School of Business Administration.

School of Dentistry

Dental Public Health Sciences

DPHS 201 Planning a Career in Dentistry for the Future (2) Future-oriented overview of important concepts in dental science, contemporary modes of patient treatment, and dental-care delivery systems. Provides firsthand exposure to practice of dentistry and prerequisite materials in oral anatomy, epidemiology, and other basic sciences subjects. Open to all second-, and third-year undergraduate students. Offered: Sp.

DPHS 449 P-Directed Studies in Dental Public Health Sciences (*) Students and faculty with common academic interests pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

DPHS 510 Social and Historical Perspectives in Dentistry (2) Examines dental care problems involving biological, behavioral, and community elements and has student develop hypotheses regarding nature and complexity of problem, set objectives, seek resources and information, and contribute to development of outcomes. Credit/no credit only. Offered: A.

DPHS 535 P-Scientific Literature in Clinical Decision Making (1) Introduction to critical reading of individual articles in professional journals and integrating the findings of several articles. Use of the literature to assist the practicing dentist in making clinical decisions. Offered: Sp.

DPHS 541 P-Ethics in Dentistry (1) Seminar improving ethical reasoning skills and conveying ethical and legal standards of the profession. Credit/no credit only. Offered: Sp.

DPHS 550 P-Directed Studies in Dental Public Health Sciences (*, max. 6) Students and faculty members who have common academic interests can pursue them together within the curriculum by means of independent study and a tutorial student-faculty relationship. Credit/no credit only. Offered: AWSpS.

DPHS 568 Biostatistics in Dentistry (3) Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or permission of instructor. Offered: jointly with BIOST 510.

DPHS 569 Clinical Epidemiology and Study Design in Dentistry (2) An introduction to epidemiological methods as they relate to dental research. Topics covered include the estimation of dental disease occurrence at patient level and site level and the design and analysis of clinical trials with special emphasis on designs unique to dentistry, such as split-mouth designs. Offered: S.

DPHS 575 Behavioral Dental Research (1) Survey of behavioral science research and methodology in dentistry and related fields. Emphasis in various quarters varies: literature review, research design, instrumentation, data analysis. Designed for advanced students who plan a research career. Credit/no credit only.

Prerequisite: doctoral degree or permission of instructor. Offered: AWSp.

DPHS 640 P-Professional Issues: Clinical Management of the Fearful and Phobic (1) Introduction to assessment process and treatment strategies for successful management of anxious, fearful, or phobic patient, combined with clinical observation of diagnostic and treatment appointments of active patients. Offered: AWSpS.

DPHS 660 Dental Fear Clinic (2) Clinical instruction in the care of the severely anxious or phobic adult or child. Strategies from behavioral and cognitive psychology. Credit/no credit only. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: AWSpS.

Dentistry

DENT 520 P-Clinical Practice Management 1 (1) Designed to provide the student with the knowledge required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, authorized treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines. Offered: S.

DENT 521 P-Oral Pathology (3) Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: A.

DENT 522 P-Oral Pathology (3) Survey of the diseases of the oral-facial regions in lecture and laboratory sessions. Among the conditions discussed are diseases of teeth and their supporting structures and diseases of the oral and paraoral soft tissues and bones. Correlations between clinical findings, etiologic factors, and histopathologic features are stressed. Attendance in the laboratory is required. Offered: W.

DENT 523 Medical Emergencies in the Dental Setting (1) Initial emergency training, focusing primary upon recertification in BLS. Emphasizes intellectual and psychomotor skills for universal treatment of emergencies (which includes BLS). Offered: A.

DENT 533 Medical Emergencies in the Dental Setting II (2) Comprehensive medical emergency training, including review of BLS. Students participate in real-time simulated drills to prepare both their intellectual and psychomotor skills for emergency care situations. Credit/no credit only. Offered: A.

DENT 534 P-Geriatric Dentistry (1, max. 2) Two-quarter sequence on special needs of older persons seeking dental care: oral health, psychology of aging, socioeconomic problems, effective communication, dental management, and special problems in long-term care settings. Offered: WSp.

DENT 537 P-Hospital Dentistry (1) Introductory course presenting hospital procedures and protocol and the role of the dentist in the hospital. Offered: Sp.

DENT 543 Medical Emergencies in the Dental Setting III (1) Comprehensive review/refreshment of medical emergency training, including recertification in BLS. Students participate in real-time simulated drills to prepare both intellectual and psychomotor skills for emergency care situations. Offered: S.

DENT 547 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: A.

DENT 548 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: W.

DENT 549 Dental Practice Administration (2) Material essential to persons entering dentistry in a time of rapid change in health care systems, including practice management, career opportunities, and starting out in a private practice. Offered: Sp.

DENT 550 P-Special Studies in Dentistry (*, max. 12) Series of courses offered by the various departments from which students may elect study in areas of special interest to them. These courses include subject matter applicable to all phases of dentistry. Credit/no credit only. Offered: AWSpS.

DENT 551 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 552 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 553 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 554 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool

during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 555 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 556 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 557 P-Clinical Practice Management 2 (1) Designed to provide the student with the experience required to manage a patient pool during the clinical program and in future dental practice including: obtaining a patient pool, treatment planning, patient management in accordance with professional codes, risk management strategies, patient financial account management, and contemporary biohazardous materials guidelines.

DENT 562 Elective Offering in Advanced Cardiac Life Support (2) Introduction to airway management (masking/intubation/oropharyngeal airways/nasopharyngeal airways/cricothyrotomy), 12-lead EKG recognition and diagnosis, cardiac physiology and pathophysiology, and pharmacologic action of several different medications. Students who pass AHA guidelines for completion of an ACLS course are awarded ACLS certification. Credit/no credit only. Offered: W.

DENT 563 Elements of Conscious Sedation (1-2) Details theory and techniques for rendering oral, inhalation, transmucosal, intramuscular, and intravenous forms of conscious sedation. Focuses on pharmacology and pharmacokinetics of nitrous oxide, benzodiazepines, narcotics, and barbiturates. Addresses usual applications, special considerations, legal issues, and proper record keeping. Emphasizes prevention and management of emergencies. Credit/no credit only. Offered: A.

DENT 565 Dental Photography (1) Provides student with sufficient knowledge and experience to select and use correct photographic equipment for photographing patients (facial and interoral), casts, instruments, x-rays, charts, and objects. Credit/no credit only. Offered: A.

DENT 566 Physical Diagnosis (1) Seminar on performing complete physical examination including basic assessment of overall patient, vital signs, cardiac, pulmonary, abdominal, extremities, neurologic, and head/neck. Examination techniques include observation, auscultation, percussion. Writing findings and interpreting physical examinations. Offered: S.

DENT 568 Internal Medicine for Dentistry ([1-3]-, max. 6) Review of major organ systems, including normal anatomy and physiology, common pathophysiologies, medical interventions. Details modifications necessary for dental treatment and medical emergency management. Credit/no credit only. Offered: AS.

DENT 569 Contemporary Dental Practice Management (1) *Chasteen* Didactic study designed to update dental graduate students in recent developments in the management of a modern dental practice. Focuses on the business and legal aspects of dental practice. Credit/no credit only. Offered: A.

DENT 610 Introduction to Clinical Dentistry (2) Introduction to clinical dental training including infection control, personal dental hygiene, oral anatomical landmarks, medical histories, fluoride application, fabrication on athletic mouth guards, and professional ethics. Students participate in classroom exercise followed by rotations in functioning dental clinics. Offered: W.

DENT 640 P-Extramural Clinics in Geriatric Dentistry (2) Extramural geriatric clinical experience, including three days at a nursing home or community clinic, and brief didactic component. Credit/no credit only. Offered: AWSpS.

DENT 645 P-Hospital Rotation (2) Clinical experience that puts into practice the material presented in 537. The student is involved in hospital procedures and protocol and in dental care of the hospital patient as well as after-hours call duty. Offered: AWSpS.

DENT 650 P-Extramurals (*, max. 12) Extramural sites arranged to provide dental students, at varying levels of their education, with opportunities to treat a wide variety of patients in the delivery systems outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

DENT 651 P-Anesthesia Rotation (6) 1.5-month rotation in anesthesia at one of three local hospitals. Objectives: administration of anesthesia, management of emergency situations and airway problems, familiarization with pharmacology of anesthetic drugs; increased efficiency with venipuncture. Credit/no credit only. Offered: AWSpS.

DENT 652 P-Clinical Medicine Clerkship (4) One-month clinical rotation in clinical medicine at a local hospital. Objective is to increase the student's ability in physical evaluation of patients as well as to give in-depth knowledge of hospital procedures and commonly prescribed medications. Credit/no credit only. Offered: AWSpS.

DENT 655 Medical Emergency Management: Basic Life Support (1) Review of principles and practical applications for the management of medical emergencies in dental practice in conjunction with training and certification in Basic Life Support. Offered: S.

DENT 657 Comprehensive Clinic (1-10, max. 10) Clinical comprehensive care for patients. Offered: S.

DENT 659 Comprehensive Clinic (1-10, max. 10) Clinical comprehensive care for patients. Offered: S.

DENT 660 Temporomandibular Joint Diagnosis and Treatment (2, max. 8) Seminar and clinic sequence for comprehensive examination, diagnosis, and treatment of patients with temporomandibular joint problems. Includes management of dysfunction and morphologic alterations in associated muscles and occlusion. Prerequisite: permission of instructor. Offered: AW.

DENT 690 P-Extended Clinical Dentistry (1) Educational experiences in clinical dentistry. Available to students who have successfully completed the University of Washington Doctor of Dental Surgery curriculum and seek additional supervised experience in the delivery of oral health care services within three quarters of graduation and prior to licensure. Prerequisite: permission of instructor. Offered: AWSpS.

DENT 700 Master's Thesis (*) Offered: AWSpS.

Endodontics

ENDO 521 Introduction to Clinical Endodontics (4) Lecture component covers the biology, pathology, diagnosis, treatment, and outcome of dentin-pulp complex and pulpal-related periradicular pathology. Preclinical laboratory component covers endodontic treatment techniques on extracted teeth from different tooth groups as practice for clinical cases. Offered: Sp.

ENDO 534 P-Endodontic Clinical Procedures(1) Lecture course dealing with clinical procedures particular to endodontics, diagnosis and treatment of endodontic emergencies, and surgical management of endodontic problems. Offered: W.

ENDO 535 P-Clinical Management of Endodontic Treatment Problems (1) Management of a variety of technical problems frequently encountered in the treatment of endodontic cases and the diagnosis and treatment of impact injuries to teeth. Offered: Sp.

ENDO 545 Honors Endodontics (2, max. 4) Seminar discussions of advanced endodontic diagnosis and treatment planning issues as well as clinical sessions on treatment of calcified negotiable canals, alternate instrumentation procedures and obturation systems. Credit/no credit only. Offered: W.

ENDO 550 P-Directed Studies in Endodontics (*, max. 6) See DPHS 449 for course description and prerequisite. Credit/no credit only.

ENDO 560 Advanced Endodontic Diagnosis and Treatment (2) Current concepts are presented and discussed relating to the diagnosis and treatment of pulpal and periapical pathosis. Criteria for evaluation of success or failure of root canal therapy are presented. Offered: W.

ENDO 561 Anatomical Basis for Clinical Endodontics (2) Root canal anatomy of significance in clinical endodontics is discussed in a seminar format. Offered: A.

ENDO 562 Anatomical Bases for Surgical Endodontics (2) Diagnosis and treatment of acute symptoms of dental origin, surgical endodontic therapy, traumatic dental injuries, and the relationship between periodontal and pulpal pathosis, including differential diagnosis and appropriate treatment planning, are discussed. Offered: Sp.

ENDO 563 Radiographic Interpretation (2)

Various aspects of radiographic interpretation of particular relevance to endodontics, including interpretation of normal structures, acquired and developmental abnormalities, infections, sialoliths, dysplasias, cysts, malignant lesions, benign tumors, and various diseases other than tumors.

ENDO 568 Endodontic Practice Management

(1) Essential elements for establishing and managing a successful specialty practice in Endodontics. Prerequisite: ENDO 562. Offered: A.

ENDO 580 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 581 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 582 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 583 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 584 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 585 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 586 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 587 Endodontic Seminar (2) Continuous weekly seminar devoted to review of endodontic and related literature and discussion of research methods.

ENDO 590 Treatment Planning Seminar (2, max. 16) Weekly seminar to discuss controversial treatment problems and difficult diagnostic cases.

ENDO 593 Clinical Practice Teaching (1, max. 3) Closely supervised experience in teaching clinical endodontics to the undergraduate dental student.

ENDO 594 Current Endodontic Literature (1) A review and critical evaluation of the contemporary literature relative to endodontics.

ENDO 595 Endodontic Surgery (2) Comprehensive review of biological and technical aspects of endodontic surgery with emphasis on both the classic and current scientific surgical literature. Lectures and topic seminar discussion along with laboratory demonstration of various surgical techniques.

ENDO 597 Endodontics Teaching Seminar (2) Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Offered: W.

ENDO 598 Endodontics Teaching Seminar (2)

Weekly seminars devoted to an examination of general problems of teaching and learning and specific problems of endodontics teaching. Offered: Sp.

ENDO 600 Independent Study or Research (*)

Prerequisite: permission of graduate program adviser.

ENDO 630 P-Clinical Endodontics (1-, max. 7)

Student is required to complete endodontic treatment of anterior, premolar, and molar teeth. In addition to nonsurgical treatment of several endodontic cases, the student assists with a periapical surgery. Student must complete seven quarters of 630 and all course requirements before a grade is awarded.

ENDO 658 Endodontic Emergency Rotation

(1) Clinical experience in managing and treating patients in pain. Offered: AWSpS.

ENDO 659 P-Endodontics Extended Learning

(*, max. 4) Supplemental work in endodontics to correct an area of student deficiency. Credit/no credit only.

ENDO 660 Clinical Endodontics (4, max. 32)

Clinical diagnosis and treatment of pulpal pathosis and related sequelae.

Oral Biology

ORALB 449 Undergraduate Research Topics in Oral Biology (*) Individual research on topics selected in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 510 P-Development, Structure, and Function of Oral Tissues (3-) Popowics Development, microscopic and submicroscopic structure, functional aspects of hard and soft oral tissues. Embryonic development of head and neck; morphodifferentiation of face and oral structures. Structure-function relationships in descriptions of development and histology-ultrastructure of oral tissues by integration of traditional oral histology and oral physiology topics. Offered: WSp.

ORALB 520 P-Molecular Microbiology and Oral Diseases (3) Darveau Applies students' background knowledge in basic sciences to an understanding of the molecular bases of the interactions between microorganisms and oral tissues that lead to plaque formation and dental diseases. Principles of clinical asepsis and diagnosis of caries and periodontal diseases also covered. Offered: Sp.

ORALB 521 Medical Microbiology and Immunology (2) Darveau Bacterial structure, physiology and genetics. Viral structure and function. Bacterial and viral diseases of the respiratory tract, skin, GI tract, UG tract. Innate and adaptive immunity. Immune responses to infection, immunodeficiencies and autoimmunity. Offered: W.

ORALB 540 P-Clinical Oral Pathology Conference (2) Morton Seminar stressing basic science aspects and clinical findings of various oral lesions through exploration of etiology, pathogenesis, histopathology, and treatment modalities for oral pathology cases drawn from files of the Division of Oral Pathology. Offered: A.

ORALB 550 P-Directed Studies in Oral Biology (*, max. 12) Morton Selected readings

and seminars on a topic chosen by individual arrangement in collaboration with a faculty member. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 561 Oral Tissue Development, Structure, and Function (3, max. 6) Popowics

Selected readings and discussions explore recent advances in cellular and molecular biology relevant to oral biology and medicine. Special emphasis on craniofacial and dental development, oral mucosa and periodontal tissues, salivary gland function, and olfaction and gustation. Prerequisite: permission of instructor. Offered: WSp.

ORALB 562 Supervised Teaching in Oral Biology (1-5, max. 10)

Directed and guided experience in selected topics in teaching techniques, teaching philosophy, and course design of courses given by the Department of Oral Biology. Students are required to participate in lecture and laboratory teaching under the supervision of the course director. Prerequisite: permission of instructor. Offered: AWSp.

ORALB 564 Clinical Oral Pathology (1-3, max. 10) Morton

Microscopic examination of oral lesions exhibiting basic histopathologic changes with gradual transition to the presentation of interesting cases from the Oral and Maxillofacial Biopsy Service, correlating the clinical findings with morphologic and pathogenic mechanisms. Primarily designed for DDS, MD, or DVM students. Offered: AWSpS.

ORALB 565 Clinical Oral Pathology (1-3, max. 10) Morton

Presentation of interesting oral lesions from the dental school and the University of Washington Medical Center and the correlation of the clinical findings with the underlying morphologic and biochemical changes in the tissues. The relation of these oral lesions to systemic disease is stressed. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 566 Surgical Oral Pathology (2-4, max. 16) Morton

Students are trained to interpret microscopic slides of lesions from the oral cavity and related areas, and to correlate these with the clinical findings. Each student is responsible for the grossing of specimens and the preparation of histology reports. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 569 Advanced Oral Microbiology (2) Darveau

Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. Offered: W.

ORALB 570 Seminar in Oral Pathology (1-3, max. 9) Morton

Consists of in-depth studies of specific oral diseases through use of seminar and discussion. Students are required to present literature reviews and to act as discussion leaders. Primarily designed for students with DDS, MD, or DVM. degrees. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 572 Oral Pathology (3, max. 6) Oda

Survey of the diseases of the oral facial regions in lecture and laboratory sessions. Diseases of teeth and their supporting structures and

diseases of the oral and paraoral soft tissues and bones. Correlations between clinical findings and histopathologic features. Attendance in the laboratory is required. Offered: AW.

ORALB 574 Clinical Stomatology (3) *Morton* Diseases of the oral cavity and jaw are presented as the practitioner encounters them—detailed clinical pictures, laboratory tests, radiographic findings, surgical exploration for the establishment of a therapeutic diagnosis. Offered: Sp.

ORALB 575 Oral Biology Seminar (1-3, max. 10) *Izutsu* Presentation and discussion of current research problems by members of the staff, investigators from other departments in the University, visiting scientists, and trainees. Prerequisite: permission of instructor. Offered: AWSp.

ORALB 576 Molecular Aspects of Epithelial Biology (1-2, max. 2) *Dale* In-depth discussion of cytoskeleton, cell junctions, influence of growth factors, retinoids, and other exogenous agents on differentiation and function of normal stratified epithelia. Prerequisite: BIOC 440 (or equivalent) or permission of instructor. Offered: odd years; Sp.

ORALB 577 Applied Therapeutics in Dentistry (2) *Watson* Practical information about drugs included in practice of dentistry. Topics include evaluation of case histories, dental considerations pertaining to medical conditions and drug therapies, types of drugs and dosages used for common medical conditions, the pharmacology of drugs prescribed by the clinician, and the mechanisms involved in drug interactions. Offered: odd years; A.

ORALB 578 Research Techniques in Oral Biology (2-4, max. 15) Introduction to biochemical, analytical, or morphological techniques employed in biochemical cytology or molecular pathology as well as *in vitro* techniques of tissue and organ culture. Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 579 Molecular Biology (2) *Presland* Applications of molecular biology and recombinant DNA methodologies to oral biology topics of interest in dental sciences. Prerequisite: BIOCHEM 405 or BIOCHEM 406 or equivalent, and permission of instructor. Offered: even years; S.

ORALB 581 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters. Offered: Sp.

ORALB 582 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters.

ORALB 583 Secretory Process in Exocrine Glands (1-3, max. 3) *Izutsu* Biostructural, physiological, and biochemical aspects of individual secretory systems as integrated units. Faculty members with appropriate expertise participate in discussions and presentations during each of the three quarters.

ORALB 591 Advanced Topics in Oral Biology and Medicine I (1-2, max. 2) *Herring* Review of current molecular and cellular advances in developmental biology relevant to head and neck embryology, tooth development and epithelial differentiation. Offered: jointly with ORTHO 591; W.

ORALB 592 Advanced Topics in Oral Biology and Medicine II (1-2, max. 2) *Herring* Review of current scientific literature relevant to cranioskeletal development and growth, bone biology and orthodontic tooth movement. Offered: jointly with ORTHO 592; Sp.

ORALB 593 Advanced Topics in Oral Biology and Medicine III (1-2, max. 2) *Herring* Review of current scientific literature relevant to oral soft tissue structure and physiology, including mastication and swallowing, salivary glands, periodontium and dental pulp. Offered: jointly with ORTHO 593.

ORALB 600 Independent Study or Research (*) Prerequisite: permission of instructor. Offered: AWSpS.

ORALB 700 Master's Thesis (*) Offered: AWSpS.

ORALB 800 Doctoral Dissertation (*) Offered: AWSpS.

Oral Medicine

ORALM 404 Considerations in Care of the Patient with a Disability (*, max. 6) Role of auxiliaries in dental treatment of the special patient, including psychosocial issues, communication techniques, wheelchair transfers; dental prevention, medical and dental management of specific disabilities; drug therapy, sedation, and anesthesia. Offered: AWSpS.

ORALM 460 Clinical Management of Patients with Disabilities (*, max. 10) Participation in chair/bedside dental treatment of a broad range of disabled populations, including homebound and institutionalized patients. Offered: AWSpS.

ORALM 465 Dental Care of the Disabled Literature Review (1) Review of the current scientific literature pertaining to disability issues, research, clinical management, resources, and legislation relating to oral health of persons with disabilities. Credit/no credit only. Offered: AWSpS.

ORALM 513 Communication Skills I - Techniques (1) Different aspects of verbal and non-verbal communication, recognizing obstacles to effective communication, and developing strategies to overcome communication obstacles. Clinical interviewing exercises. .

ORALM 514 Communication Skills II - Cultural Competency (1) Continuation of basic communication skills. Credit/no credit only. Offered: A.

ORALM 515 Communication Skills III - Interviewing and Hx-taking (1) Provides early clinical experience, and develops skills necessary to learn from patients what the practitioner needs to know about their social, medical, and dental histories to effectively understand the "whole patient" so as to diagnose, plan, and provide appropriate treatment. Credit/no credit only. Offered: A.

ORALM 516 Physical Exam I (1) Addresses

techniques of initial patient assessment including general survey of the patient and vital signs assessment. Includes development of skills through participation in clinical sessions. Credit/no credit only. Offered: W.

ORALM 517 Physical Examination II (2) Lectures, clinical rotations, and seminars addressing techniques of patient assessment including history-taking, physical examination, and interpretation of findings. Includes development of skills through participation in clinical sessions.

ORALM 520 P-Introduction to Oral Radiology (2) Physical, biological, technical, and diagnostic aspects of dental x-ray procedures. Offered: AWSp.

ORALM 524 Communication Skills in Dentistry — Introduction to Patient Interviewing (1) Different aspects of verbal and non-verbal communication, recognizing obstacles to effective communication, and developing strategies to overcome communication obstacles. Clinical interviewing exercises. .

ORALM 525 Physical Examination III (1) Intensive review and application of techniques of patient assessment including history-taking, physical examination, and interpretation of findings. Includes development of skills through participation in clinical sessions.

ORALM 526 General Medicine (2) Addresses medical, physical, and psychological conditions that impact the practice of dentistry. Provides information regarding collection of appropriate medical and physical data and integration of information into plans and practices relevant to the routine management of patients in dental practices. Instruction occurs via lectures, videos, assigned readings, and case scenarios.

ORALM 527 Introduction to Treatment Planning (1) Problem-oriented record system with basic concepts of treatment planning. Students prepare treatment plans in advance of seminar. Offered: Sp.

ORALM 528 Dental Education and Care of the Disabled (1) Addresses the special needs and dental management of patients with developmental disabilities such as Down's syndrome, cerebral palsy, mental retardation, and other conditions such as head trauma. Utilizes instructional videos.

ORALM 529 Stomatology (4) Focuses on ability to recognize, diagnose, and treat non-dental oral diseases and conditions that are commonly encountered in clinical practice. Rotations through the oral medicine undergraduate clinic where students take history and examine patients presenting for comprehensive care or urgent care. Interpretation and management of non-dental oral pathology and medical/psychological issues. Offered: S.

ORALM 531 P-Acute and Chronic Orofacial Pain (1) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: A.

ORALM 532 P-Acute and Chronic Orofacial Pain (1) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: W.

ORALM 533 P-Acute and Chronic Orofacial Pain (2) Essential clinical and technical information and skills for diagnosis and treatment of acute and chronic pain, including differential diagnosis, and behavioral factors. Offered: Sp.

ORALM 540 P-Oral Medicine Senior Seminar (2-, max. 4) Clinical conference devoted to case presentations of patients with dental treatment needs and complicating medical problems. Offered: AW.

ORALM 545 P-Clinical Conference in Oral Medicine (1-, max. 2) Clinical pathologic conference utilizing interdisciplinary approach to patient care and emphasizing basic science application. Offered: AW.

ORALM 550 P-Directed Studies in Oral Diagnosis (*, max. 12) See DPHS 449 for course description and prerequisite. Offered: AWSpS.

ORALM 560 Advanced Diagnostic Techniques (2) Advanced diagnostic procedures used to identify oral and perioral diseases. Included are in-depth discussions of history analysis, methods for psychologic evaluation, soft and hard tissue diagnostic procedures, neurologic, salivary gland, and other tissue analyses requiring special procedures. Offered: AWSpS.

ORALM 564 Dental Care of the Disabled I (*, max. 10) Advanced topics in rehabilitation dentistry including psychosocial issues; characteristics and needs of patients with specific disabilities; patient management and use of portable equipment; drug therapy, sedation and anesthesia; dental prevention, and emergency procedures. Seminars and self-directed study. Prerequisite: permission of instructor. Offered: AWSpS.

ORALM 565 Oral Medicine Clinical Conference (*, max. 16) Clinical conference in which diagnostic data concerning patients seen in the oral medicine clinic are presented for evaluation. When possible, the patient is present with laboratory findings, radiographs, and the results of special tests. Offered: AWSpS.

ORALM 567 Behavioral Management of Acute and Chronic Orofacial Pain (2) Overview of adult psychopathology and illness behavior as it relates to psychosomatic concepts and chronic pain. review of assessment and behavioral management strategies for the dental practitioner. Open to graduate students, postdoctoral fellows, residents in dentistry, medicine, psychology. Offered: Sp.

ORALM 570 Oral Medicine and Therapy (2-, max. 6) Lecture directed toward the presentation and discussion of oral diseases and oral manifestations of systemic disease. Primarily the clinical manifestations' relationship to generalized disease processes and patient management with in-depth discussions of therapy. Offered: AWSpS.

ORALM 576 Oral Medicine Literature Review (1) Seminar analyzes the recent literature concerning the area of oral medicine, diagnosis, and therapy for oral disease. Offered: AWSpS.

ORALM 578 Dental Care of the Disabled Literature Review (1, max. 3) Review of the current scientific literature pertaining to disability issues, including research, clinical management, resources, and legislation pertaining to oral health of persons with disabilities. Credit/no credit only. Offered: AWSpS.

ORALM 580 Current Concepts in Oral Radiology (2) Lecture/seminar covering current concepts in oral radiology including technical factors, radiation risks, observer characteristics and variation, radiographic localization, interpretation, and overview of current extraoral techniques. Offered: AWSpS.

ORALM 581 Advanced Seminars in Oral Radiology (2, max. 8) Explores aspects of oral and maxillofacial radiology and related fields. Offered: AWSpS.

ORALM 584 Dental Care of the Disabled III (*, max. 10) Field practice in community outreach to facilities and agencies serving disabled populations. Includes observation, dental screenings, patient education and in-service training of direct care staff. Prerequisite: ORALM 404 or ORALM 664. Offered: AWSpS.

ORALM 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

ORALM 601 Oral Medicine Research Seminar (1, max. 10) Presentation and discussion of current research problems by graduate students, faculty, and investigators from other departments in the university. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

ORALM 630 P-Clinical Diagnosis and Oral Medicine ([1/2]-, max. 5) Develops skills in assessment of patients requiring comprehensive dental care. Includes interviewing and physical examination, radiographic interpretation, problem list formation, and chart documentation. Students participate in diagnosis and treatment of patients requiring emergency and specialized dental care. Offered: AWSpS.

ORALM 640 Advanced Clinical Diagnosis and Oral Medicine ([1/2]-, max. 3) Advanced instruction in diagnosis and management of patients requiring emergency and specialized care. Includes participation in clinical rotations to oral medicine specialty clinics. Offered: AWSpS.

ORALM 650 P-Oral Medicine Clinical Elective (1-6, max. 6) Opportunities for students to work in various clinical activities at local hospitals or other sites outside the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

ORALM 660 Rotations in Medical Disciplines (1-4, max. 24) Clinic, oriented to the hospital practice of oral medicine, deals with examination and nonsurgical therapy of hospital patients. The conditions treated include primary oral diseases, oral manifestations of systemic diseases, and oral defects resulting from medical treatment of serious systemic disease. Credit/no credit only. Offered: AWSpS.

ORALM 663 Introduction to Educational Methods in Dentistry (2) Principles of teaching and learning, their applications in dental education. Basic principles include learning theory and cognitive processing, identifying prerequisite knowledge of learners, determining objectives of outcomes of learning, selecting appropriate methods and materials, using evaluation procedures. Increases understanding of instruction process to provide a sound foundation for teaching. Offered: AWSpS.

ORALM 664 Dental Care of the Disabled II (*, max. 10) Practicum in chair/bedside delivery of dental care to different disabled populations. Includes rotations to institutions, long-term care

facilities, and homebound service, using mobile equipment. Prerequisite: ORALM 564 and permission of instructor. Offered: AWSpS.

ORALM 665 Clinical Oral Medicine (*, max. 33) Clinic involving the diagnostic evaluation of patients with difficult and unusual oral diseases. The student diagnoses and treats the patient. Types of therapy include medications and chemical agents, functional physical therapy, and counseling. Offered: AWSpS.

ORALM 670 Clinical Oral Medicine Teaching (1-4, max. 16) Clinic designed to give the student experience and instruction in the teaching of clinical oral diagnosis. Treatment of emergency dental problems as well as routine and special diagnostic procedures is emphasized. Offered: AWSpS.

Oral Surgery

O S 520 P-Local Anesthesia (2) Pharmacology, physiology, anatomy, and techniques of local anesthesia for dental students.

O S 530 Oral Surgery: Didactic (1, max. 3) Covers the scope of oral and maxillofacial surgery as practiced in the United States today. Introductory course for predoctoral dental students.

O S 532 P-Sedation and Pain Control (2) Techniques of sedation (oral, inhalational, intravenous) and pain control.

O S 550 P-Directed Studies in Oral Surgery (*, max. 16) See DPHS 449 for course description and prerequisite.

O S 560 Dental Sedation (2) For graduates of the various dental specialties on the theory, application, and techniques of dental sedation. All forms of sedation, including oral, intramuscular, intravenous, and inhalation, are covered. Clinical experience is provided in the second half of the quarter.

O S 630 P-Clinical Oral Surgery (2, max. 6) Clinical experience in simple and complex dentoalveolar and pre-prosthetic surgery. A problem-based course using an auto-tutorial approach covering the extraction of teeth, impaction surgery, medications, surgical complications, treatment of infections, bone cysts, maxillary sinus complications, and salivary gland and mucosal pathology. Credit/no credit only.

O S 651 P-Harborview Clerkship (2-10, max. 10) Six-week rotation at Harborview Medical Center, including intensive instruction in oral surgery procedures and observing and assisting oral and maxillofacial surgery in the operating room. Credit/no credit only. Prerequisite: permission of department chairperson.

Orthodontics

ORTHO 449 Directed Studies in Orthodontics (*) See DPHS 449 for course description and prerequisite. Credit/no credit only. Offered: AWSpS.

ORTHO 520 P- Growth and Development of the Face and Dentition (2) Covers basic concepts in orthodontic work. Exposes students to the growth and development of the oro-facial structures and how orthodontists can use predict and use growth to treat malocclusion. Reviews

concepts from basic biology and covers specific topics related to orthodontic tooth movement and orthopedic treatment. Offered: A.

ORTHO 521 Growth and Development in Ortho Dx and Tx (3) Basic principles of pre and postnatal growth and development integrated with the recognition, analysis, and treatment of planning of problems encountered in dental and skeletal malocclusions.

ORTHO 522 P-Beginning Adjunctive Orthodontics (2) Lecture/laboratory instruction in indications for, and techniques of, simple orthodontic tipping, rotational and extrusive movements, as well as orthodontic study model fabrication. Prerequisite: ORTHO 520. Offered: S.

ORTHO 550 P-Directed Studies in Orthodontics (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: AWSpS.

ORTHO 551 Review of Selected Literature in Orthodontics (1) Students select a topic for review, review appropriate literature, and prepare written critique. Offered: AWSp.

ORTHO 552 Journal Club (1) Predoctoral students join graduate students in review of current orthodontic literature. Offered: AWSp.

ORTHO 560 Orthodontics Seminar (1-5, max. 25) Methods of diagnosis, analysis, and treatment planning of malocclusion; analysis of methods and theoretical principles used in the treatment of malocclusion. The student presents a detailed case analysis and plan of treatment for each clinical patient supervised. Offered: AWSpS.

ORTHO 562 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 563 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 564 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 565 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 566 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 567 Orthodontic Theory (2) Lecture-seminar sequence dealing with interpretation and application of orthodontic principles and concepts. Pertinent literature, research findings, and current orthodontic theory are analyzed in depth. Offered: AWSpS.

ORTHO 570 Roentgenographic Cephalometry (2) Basic principles, history, and techniques of roentgenographic cephalometry. Offered: AS.

ORTHO 575 Post-Retention Seminar (1, max. 2) Each student is required to locate three or more former orthodontic patients who qualify as at least ten years postretention. Complete orthodontic records must be obtained, analyzed, and discussed in the seminar. Instructor critiques the presentation and offers similar or contrasting cases for comparison. Offered: WSp.

ORTHO 580 Functional Cranial Anatomy (3) *Herring* Lecture and laboratory dissection concentrating on clinical and functional anatomy of the head and neck. Offered: S.

ORTHO 582 Adult Orthodontics Seminar (2) Seminar for orthodontic, periodontic, and restorative dentistry graduate students in comprehensive, integrated diagnosis and treatment planning of the dental problems of the adult patient. Offered: AWSpS.

ORTHO 585 Surgical Orthodontic Diagnosis and Treatment Planning (3) Seminar and clinic for orthodontic graduate students and oral surgery residents in comprehensive, integrated diagnosis, and treatment planning for patients with major facial deformities. Offered: AWSpS.

ORTHO 584 Clinical Management of Cleft Lip and Palate and Craniofacial Anomalies (2) Management of these complex patients involves members of a dedicated, highly specialized multidisciplinary team. Insight gained into specific evaluation and treatment modalities of each discipline through lectures, seminars, assigned readings. Integrated approach to management is illustrated by attendance at craniofacial staffing and clinics. Prerequisite: graduate students in orthodontics. Offered: AW.

ORTHO 587 Management of Debilitated Dentitions (1-, max. 2) Integrated diagnosis and treatment planning for patients with edentulous spaces, emphasizing use of osseointegrated implants. Offered: AW.

ORTHO 589 Applied Psychology in Orthodontics and Pediatric Dentistry (1) Application of psychological theories, research, and intervention strategies to orthodontics and pediatric dentistry. Topics include the principles of behavior change, patient compliance with therapeutic regimens, and motivations for orthodontic treatment. Prerequisite: graduate standing in dentistry or permission of instructor. Offered: A.

ORTHO 590 Scientific Methodology in Dental Research (2) Review of the scientific method. Evaluation of dental literature. Discussion of proposed master's degree research projects. Formulation and discussion of hypothetical research projects related to orthodontics. Offered: W.

ORTHO 591 Advanced Topics in Oral Biology and Medicine I (1-2, max. 2) *Herring, Izutsu* Review of current molecular and cellular advances in developmental biology relevant to head and neck embryology, tooth development and epithelial differentiation. Offered: jointly with ORALB 591; A.

ORTHO 592 Advanced Topics in Oral Biology and Medicine II (1-2, max. 2) *Herring* Review of current scientific literature relevant to

cranioskeletal development and growth, bone biology and orthodontic tooth movement. Offered: jointly with ORALB 592; W.

ORTHO 593 Advanced Topics in Oral Biology and Medicine III (1-2, max. 2) *Herring* Review of current scientific literature relevant to oral soft tissue structure and physiology, including mastication and swallowing, salivary glands, periodontium and dental pulp. Offered: jointly with ORALB 593; Sp.

ORTHO 597 Preclinical Technique (1) Techniques of construction and manipulation of the edgewise arch mechanism. Offered: AWS.

ORTHO 598 Archwire Formation (1) Principles of wire bending and the use of orthodontic pliers. Offered: AS.

ORTHO 599 Biomechanics (1) Principles of biologic reactions to application of orthodontic forces. Credit/no credit only. Offered: S.

ORTHO 600 Independent Study or Research (*) Managing the experimental protocol. Data collection and analysis. Preparation and writing of a thesis or publishable manuscript. Prerequisite: permission of instructor. Offered: SpS.

ORTHO 630 P-Introduction to Clinical Orthodontics (1) Direct clinical application of principles of orthodontic diagnosis and treatment planning for simple orthodontic appliances to modify tooth position in preparation for definitive restorative and/or periodontal therapy. Prerequisite: ORTHO 522. Offered: ASpS.

ORTHO 631 Minor Orthodontic Treatment (1) Clinical treatment of minor orthodontic problems suitable for the general dentist i.e., direct clinical application of principles of orthodontic diagnosis and treatment planning for simple orthodontic appliances to modify tooth position in preparation for definitive restorative or periodontal therapy. Offered: AWSpS.

ORTHO 660 P-Clinical Orthodontics (1-6, max. 24) Clinical application of the techniques in the treatment of malocclusion. Offered: AWSpS.

ORTHO 682 Adult Orthodontics Clinic (1) Clinic for orthodontic graduate students in the treatment of the dental problems of the adult patient. Offered: AWSpS.

Pediatric Dentistry

PEDO 520 P-Pediatric Dentistry (4) Introduction to clinical pediatric dentistry, including behavior management, oral diagnosis, preventive dentistry, dental anomalies, radiography, anesthesia, restorative procedures, pulpal therapy, interceptive orthodontics, and traumatic dental injuries of the child patient. Offered: S.

PEDO 550 P-Directed Studies in Pediatric Dentistry (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: S.

PEDO 560 Fundamentals of Pediatric Dentistry (1) Preclinical laboratory, lecture course covering fundamentals of primary care in pediatric dentistry, including behavior management, dental emergencies, prevention, diagnosis and treatment planning, and infection control. Offered: S.

PEDO 570 Pediatric Dentistry Seminar I (2) Series of seminars covering principles and theory of child development and behavior management

for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

PEDO 571 Pediatric Dentistry Seminar II (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

PEDO 572 Pediatric Dentistry Seminar III (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: W.

PEDO 573 Pediatric Dentistry Seminar IV (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

PEDO 574 Pediatric Dentistry Seminar V (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: S.

PEDO 575 Pediatric Dentistry Seminar VI (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: A.

PEDO 576 Pediatric Dentistry Seminar VII (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of

children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: W.

PEDO 577 Pediatric Dentistry Seminar VIII (2)
Series of seminars covering principles and theory of child development and behavior management for pediatric patient, including sedation, general anesthesia, and principles of informed consent, pathology of oral manifestations of diseases of children and adolescents, pediatric radiology, and use of computers in didactic, clinical, and research endeavors, and the scientific basis for the prevention and treatment of dental caries, periodontal disease, and developmental anomalies. Offered: Sp.

PEDO 580 Developmental Disabilities Seminar (1)
Multidisciplinary approach to managing children with developmental disabilities. Offered: S.

PEDO 581 Developmental Disabilities Seminar (1)
Multidisciplinary approach to managing children with developmental disabilities. Offered: A.

PEDO 582 Developmental Disabilities Seminar (1)
Multidisciplinary approach to managing children with developmental disabilities. Offered: W.

PEDO 583 Developmental Disabilities Seminar (1)
Multidisciplinary approach to managing children with developmental disabilities. Offered: Sp.

PEDO 584 Pediatric Dentistry Seminar (2)
In-depth knowledge and understanding of the topics related to, and supportive of, the clinical practice of pediatric dentistry.

PEDO 600 Independent Study or Research (*)
Prerequisite: permission of instructor. Offered: AW.

PEDO 610 Clinical Pediatric Dentistry (3)
Major clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered for the length of the program at the University of Washington pediatric dental clinic.

PEDO 630 P-Clinical Pediatric Dentistry (1-, max. 7)
Educational experiences in comprehensive clinical pediatric dentistry. Students register third and fourth years for 24 sessions in the pediatric dentistry clinic, a 3-day rotation at a community clinic, computer assisted clinical simulations, behavioral change projects, and a written analysis of videotaped patient/student clinic encounters. Offered: AWSpS.

PEDO 650 P-Pediatric Dentistry Extramurals (1-6, max. 6)
Clinical extramurals in the field of children's dentistry. Prerequisite: permission of instructor. Offered: AWSpS.

PEDO 660 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

PEDO 661 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: A.

PEDO 662 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: W.

PEDO 663 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

PEDO 664 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: S.

PEDO 665 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: A.

PEDO 666 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: W.

PEDO 667 P-Clinical Pediatric Dentistry (1-3, max. 3)
Clinical experience for graduate pediatric dental students in basic through advanced pediatric dentistry. Offered: Sp.

PEDO 668 Clinical Clerkship in Pediatric Dentistry: Yakima Valley (*, max. 5)
Comprehensive dental care for economically-disadvantaged children in a rural community health center. Offered: AWSpS.

PEDO 669 Supervised Clinical Teaching (1-3, max. 4)
Graduate pediatric dental students provide clinical instruction for predoctoral dental students by supervising clinical sessions. Offered: AWSpS.

PEDO 670 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: S.

PEDO 671 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

PEDO 672 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

PEDO 673 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

PEDO 674 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: S.

PEDO 675 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: A.

PEDO 676 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: W.

PEDO 677 Hospital Pediatric Dentistry (1-3, max. 3)
Diagnosis, management, and treatment of patients with disabilities in Children's Hospital Dental Clinic. Offered: Sp.

PEDO 679 Care of the Disabled Pediatric Patient (1) Clinical experiences in the management of disabled patients. Offered: S.

PEDO 680 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: S.

PEDO 681 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: A.

PEDO 682 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: W.

PEDO 683 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: Sp.

PEDO 684 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: S.

PEDO 685 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: A.

PEDO 686 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: W.

PEDO 687 Pediatric Dentistry under General Anesthesia (1-4, max. 4) Clinical course involving preoperative assessment of comprehensive dental treatment under general anesthesia and follow-up care. Offered: Sp.

PEDO 690 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: A.

PEDO 691 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: W.

PEDO 692 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: Sp.

PEDO 693 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: S.

PEDO 694 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: A.

PEDO 695 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: W.

PEDO 696 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: Sp.

PEDO 697 Craniofacial Anomalies Clinic (1-4, max. 4) Multidisciplinary clinic in which children with craniofacial anomalies are evaluated and complex treatment plans developed and assessed. Offered: S.

PEDO 699 Pediatric Orthodontic Clinic (1-4, max. 4) Clinical orthodontic care for pediatric patients. Offered: AWSpS.

Periodontics

PERIO 449 Directed Studies in Periodontics (*) See DPHS 449 for course description and prerequisite.

PERIO 517 Introduction to Periodontics (2) Epidemiology, natural history, etiology, histopathology, and genetics of various periodontal diseases. Offered: Sp.

PERIO 525 P-Prevention/Periodontics (2-) Introduction to periodontal therapy. Offered: W.

PERIO 526 P-Prevention/Periodontics (-2) Overview of preventive dentistry, introduction to periodontal therapy. Offered: Sp.

PERIO 530 P-Principles of Periodontics (2-) Diagnosis of periodontal diseases and development of a treatment plan including maintenance program, rationale for non-surgical, surgical, and antibacterial management of periodontal diseases. Discussion of principles of various periodontal procedures. Prerequisite: PERIO 525-526 and PERIO 527. Offered: A.

PERIO 531 P-Principles of Periodontics (-2) Seminar emphasizing multidisciplinary approach to comprehensive treatment planning. Offered: W.

PERIO 540 Advanced Periodontics (1) Designed to improve the understanding of sequencing of patient care and providing periodontal therapy into the perspective of a comprehensive care system. Offered: A.

PERIO 550 P-Directed Studies in Periodontics (*, max. 6) See DPHS 449 for course description and prerequisite.

PERIO 561 Periodontal Case Management (2-, max. 8) Didactic presentation of clinical periodontics to provide a comprehensive view of the field and a grasp of modern therapeutics. Offered: AWSpS.

PERIO 566 Practice Management (1) Aspects of setting up and administering a private periodontal practice. Financing, insurance, office design, equipment, employees, professional forms, marketing strategies, and patient management. Prerequisite: PERIO 561. Offered: S.

PERIO 567 Oral Medicine Case Studies (1, max. 3) Weekly seminar discussing series of unknown oral and perioral conditions. Discussion

of history taking, differential diagnoses, relevant tests, therapeutic approaches, and outcomes. Offered: AWSp.

PERIO 574 Periodontal Microbiology (2) Viral, bacterial classification; physiology; toxicity mechanisms reviewed. Formation and composition of plaque and calculus, and chemical methods of control discussed. Specific microbial floras of acute and chronic gingivitis, early onset forms of periodontitis, and adult periodontitis studied. Principles of antibiotic use reviewed. Offered: jointly with ORALB 569; A.

PERIO 575 Immunologic Aspects of Oral Diseases (2) Lecture course designed to acquaint students with basic concepts of immunology and immunopathology. Topics include cellular immunology, antibody structure and function, complement system, immunopathologic mechanisms, tumor immunology and immunologic manifestations in mucocutaneous oral lesions as well as immunology of caries and periodontal disease. Offered: W.

PERIO 576 The Molecular and Cellular Biology of the Periodontium (2) Nucleic acid, protein, and carbohydrate biochemistry reviewed. Roles of collagens and proteoglycans in gingival tissues and the organization of oral epithelia discussed. Structures of human and animal periodontal lesions compared. Cellular and molecular inflammatory and immunological mechanisms in periodontal disease discussed. History, classification, and epidemiology of periodontal diseases described. Offered: Sp.

PERIO 577 Review of Literature (2, max. 16) Concise review of the scientific periodontal literature with specific focus on studies of periodontal diagnosis, wound healing, periodontal regeneration, microbiology, and implant procedures. Offered: AWSpS.

PERIO 578 Implant Literature Review (1) *Verardi* Reviews several topics related to dental implantology such as: history of dental implants, osseointegration, properties of materials, bone healing, bone augmentation procedures, success rates, pathogenesis of implant failures, and aesthetics in implantology. Discusses the relationship between surgical and restorative treatment phases. CR/NC only. Offered: AWSp.

PERIO 580 Foundations in Implant Dentistry (1) *London, Raigrodski* Details the core surgical and prosthetic considerations in dental implant patient care. Topics include case planning, anatomy, radiography, surgery, componentry, occlusion, and applications for implant dentistry. Offered: S.

PERIO 582 Periodontic Treatment Planning Seminar (1-, max. 12) Weekly seminar involved with the presentation, discussion, and tentative solution of moderate to complex problems in diagnosis and treatment. Offered: AWSpS.

PERIO 585 Periodontal Therapy Seminar (1-, max. 12) Weekly seminar utilizing the case review method and dealing with the treatment of moderate to advanced periodontal disease. Offered: AWSpS.

PERIO 586 Longitudinal Evaluation of Periodontal Therapy (1-, max. 9) Close examination of case progress from initial therapy to most recent maintenance visits to determine efficacy of method, demands upon patient, and temporal effect of therapy and survival. Preparation and delivery of a lecture on a therapeutic modality. Offered: AWSp.

PERIO 592 Prescription Surgery (1-) Clinical course in periodontal surgery in which surgical procedures are performed on prescription basis for patients undergoing therapy in the undergraduate dental clinic. Exposes student to a wider spectrum of patients and to stimulate an environment in which the student can encounter the problems in communication and patient management that occur in the private sector.

PERIO 600 Independent Study or Research (*)
Prerequisite: permission of graduate program adviser.

PERIO 620 P-Introduction to Clinical Periodontics (1) Clinical periodontics, with emphasis on examination, assessment, and treatment planning. Offered: S.

PERIO 630 P-Periodontics (1-) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: A.

PERIO 631 P-Periodontics (-1-) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: W.

PERIO 632 P-Periodontics (-1) Students diagnose periodontal disease and plan and perform periodontal therapies, treating patients in a stepwise manner, describing clinical conditions, and integrating periodontal therapy in a comprehensive plan of care. Prerequisite: PERIO 525-526 and PERIO 517. Offered: Sp.

PERIO 639 Advanced Clinical Periodontics (1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases.

PERIO 640 P-Advanced Clinical Periodontics (1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: A.

PERIO 641 P-Advanced Clinical Periodontics (-1-) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: W.

PERIO 642 P-Advanced Clinical Periodontics (-1) Maintenance and treatment of patients with more complex periodontal involvement. Development of skill in comprehensive treatment planning and execution by the individual student. Allowance made for surgical periodontics and experience in assisting in the treatment of advanced cases. Offered: Sp.

PERIO 659 P-Periodontics Extended Learning (*, max. 4) Supplemental work in periodontics to

correct an area of student deficiency. Credit/no credit only.

PERIO 660 Clinical Periodontics ([2-6]-, max. 60) Clinical experience in diagnosis and treatment of periodontal disease.

PERIO 661 Advanced Root Preparation (1)
Daubert Advanced skill development in the use of the periodontal probe, gracey curettes, files and instrument sharpening. Includes laboratory sessions on dentoforms leading up to treatment of initial therapy patients. Offered: S.

PERIO 662 Stomatology Clinic (1, max. 4) The diagnosis and treatment of oral and perioral lesions including history taking, biopsies, hematological laboratory tests and chemotherapy. Periodontal therapy in medically compromised patients in the hospital setting. Microscopic review of biopsy specimens. Offered: AWSpS.

PERIO 663 Pre-Prosthodontics Clinical Periodontics (*) Clinical diagnosis and treatment of periodontal disease for nonperiodontics student. Prerequisite: permission of department chairperson.

PERIO 665 Clinical Practice Teaching (*)
Supervised experience in teaching clinical periodontics to undergraduate dental students.

PERIO 685 Hospital Periodontics (1)
Preparation in periodontics to practice in hospital situations, including experience in operation of nitrous oxide analgesia, general anesthesia, intravenous premedication, treating of out- and inpatients.

Prosthodontics

PROS 520 P-Introduction to Complete Dentures-Lecture (3) Didactic course in the treatment of completely edentulous patients. Instruction is provided in diagnostic procedures, complete denture construction, and maintenance care. Offered: A.

PROS 521 P-Management of Immediate Denture Patients (1) Lecture course describing and illustrating the clinical management of immediate denture patients (typical and overdenture). Offered: S.

PROS 523 P-Removable Partial Denture Design (2) Lectures in the basic principles of removable partial denture design. Practical drawings and more advanced designs are discussed in seminars. Certain technical aspects of design procedures are done in the classroom. Offered: W.

PROS 525 P-Removable Partial Denture Clinical Preparatory Course (4) Lecture-laboratory course dealing with those procedures the dentist must perform in order to fabricate a physiologically acceptable removable partial denture. The student gains experience via clinically simulated laboratory exercises prior to beginning prosthodontic treatment of a partially edentulous patient. Offered: S.

PROS 560 Complete and Immediate Dentures (2) Lecture/seminar devoted to the diagnosis and treatment of the completely edentulous patient and the immediate denture patient, with emphasis on management of patients with difficulties in treatment. Offered: A.

PROS 562 Removable Partial Dentures (2)

Lecture/seminar concentrating on factors peculiar to fabrication of removable partial dentures, with emphasis on management of combined fixed and removable therapy. Offered: W.

PROS 563 Maxillofacial Prosthetics I (1)
Introductory lecture/seminar series with emphasis on diagnosis and prosthodontic rehabilitative treatment of patients who have experienced trauma or have congenital or acquired defects in the oral region. Offered: S.

PROS 564 Maxillofacial Prosthetics II (1)
Introductory lecture series focusing on the prosthodontic rehabilitation of patients with loss and compromise of facial anatomy, i.e., ocular, orbital, nasal, auricular, combination intraoral/extraoral, and other related facial deformities.

PROS 571 Review of Literature Seminar (1, max. 12) Continuous weekly seminar devoted to the review of prosthodontic and related literature.

PROS 572 Special Topics Related to Prosthodontics (1) Lecture-seminar series focusing on relating principles of basic science to clinical application in prosthodontics. A wide and varied range of topics including surgery, psychology, speech, pharmacology, practice management, physiology, temporomandibular/myofascial joint dysfunction.

PROS 600 Independent Study or Research (*)
Prerequisite: permission of graduate program adviser.

PROS 620 P-Clinical Complete Dentures (1/3, max. 3) Basic principles of complete denture fabrication and of diagnosis and treatment of completely edentulous patient. In second quarter student completes denture patient care, provides follow-up treatment, and participates in four competency examinations. Offered: AW.

PROS 630 P-Clinical Prosthodontics ([1-2]-, max. 5) Clinical course involving the diagnosis and management of completely and partially edentulous patients. Removable partial dentures and immediate dentures are fabricated. Follow-up care provided for patients previously treated.

PROS 640 P-Clinical Prosthodontic Maintenance (1-, max. 3) Clinic involving additional patient treatment with complete, partial, or intermediate dentures, plus indirect relines, managing adjustment chair, peer review, recall clinic, and follow-up care for patients previously treated. Offered: AWSp.

PROS 650 P-Extramurals in Prosthodontics (*, max. 12) Elective clinical experiences or clinical practice teaching. Credit/no credit only. Prerequisite: permission of instructor.

PROS 660 Clinical Prosthodontics (1-2, max. 6) Practical application of material covered in 560 and 562.

PROS 665 Clinical Practice Teaching (1-, max. 4) Supervised experience in teaching clinical prosthodontics to the undergraduate dental student.

Restorative Dentistry

RES D 510 P-Dental Materials Science ([1/2]-, max. 3) Basic concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Clinical use of restorative dental materials also presented. Offered: WSp.

RES D 511 P-Applied Dental Materials (3)

Lecture/laboratory emphasizing proper use of restorative dental materials through simulated clinical projects. Student self-evaluation also emphasized. Offered: Sp.

RES D 515 P-Dental Anatomy (3) Lecture and laboratory on the morphology and nomenclature of individual teeth of the adult human dentition. Introduction to tooth histology and function and the influence of tooth anatomy on clinical dental procedures. Offered: A.

RES D 516 P-Introduction to Occlusion (3)

Lecture/laboratory in the functional determinants of occlusal morphology. Preparation and waxing techniques for developing opposing quadrants by the additive waxing technique. Offered: W.

RES D 517 P-Functional Analysis of Occlusion (3) Clinical and laboratory experiences in examination and charting of patient's occlusion, record-taking for analysis of occlusion on a dental articulator, and preclinical diagnostic correction of problems of occlusion on articulated clinical casts. Provides basic background or technique information relative to laboratory and clinical experiences. Offered: Sp.

RES D 519 P-Operative Dentistry (1) Lecture series introducing operative dentistry. Nomenclature, cavity classification, instrumentation, pulp protection, and principles of cavity preparation. Offered: Sp.

RES D 520 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for one-surface restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: A.

RES D 521 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for multiple-surface direct filling restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: W.

RES D 522 P-Introduction to Operative Dentistry Technique (3) Introduces processes of restoring diseased or damaged tooth structure to proper health, form, function, and esthetics. Emphasis on basic principles of cavity preparation for proper coverage cast gold and foundation buildup restorations. Other considerations include restoration design, proper selection and use of restorative materials, and clinical considerations for restorative treatment planning. Following demonstration of competence in didactic and practical aspects. Limited opportunity available for introduction to restorative care. Offered: Sp.

RES D 525 P-Fixed Prosthodontics (3) Serves as introduction to area of restorative dentistry dealing with indirect partial-coverage restorations

and complete coverage restorations. Preclinical experience provided in tooth preparation, provisional restoration, and fabrication for various crown designs. Projects emphasize the various designs of single-tooth preparations and restoration. Offered: A.

RES D 526 P-Fixed Prosthodontics (3) Serves as introduction to area of fixed prosthodontics dealing with multiple-unit restorations. Preclinical experience provided with multiple tooth preparations and provisional restoration. Fabrication for various crown designs, singly and in conjunction with various pontic and connector types, to serve as fixed partial denture prostheses. Projects emphasize multiple-tooth preparation/restoration and implant-supported restorations. Offered: W.

RES D 527 P-Fixed Prosthodontics (3) Serves as introduction to area of fixed prosthodontics dealing with esthetic veneer indirect restorations. Preclinical experience provided in tooth preparation and restoration, fabrication for various esthetic veneer crown designs, singly and in conjunction with various pontic types to serve as fixed partial denture prostheses. Projects emphasize anterior single- and multiple-tooth preparation/restoration, provisional prostheses, and esthetic veneer restorations. Offered: Sp.

RES D 530 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Emphasis on single-unit gold and esthetic veneer clinical procedures. Offered: A.

RES D 531 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Emphasis on multiple-unit gold and esthetic veneer clinical procedures. Offered: W.

RES D 532 P-Restorative Dentistry (2) Lecture series related to 630 presenting restorative dentistry principles, including supportive material on clinical procedures. Offered: Sp.

RES D 535 Implant Dentistry (3) Junge Includes: history of implantology; basic science of osseointegration; surgical, prosthetic, and restorative considerations for the partially and fully edentulous patient; occlusal considerations of implant treatment; surgical placement and restorative procedures; management of patients; surgical and prosthetic complications; developing a treatment plan on assigned case; and restoring a single tooth implant. Offered: A.

RES D 540 Implant Dentistry (2) Introduction to dental implantology based on lectures and laboratory activities. Offered: A.

RES D 541 P-Advanced Restorative Dentistry (2) Broadens base of restorative procedures. Introduction of new techniques and presentation of complex restorative treatment involving other specialties. Offered: W.

RES D 542 P-New Developments in Dental Materials (1) Dental materials recently introduced to dental profession reviewed, compared to current materials, and clinically demonstrated. Offered: Sp.

RES D 550 P-Directed Studies in Restorative Dentistry (*, max. 6) See DPHS 449 for course description and prerequisite. Offered: AWSpS.

RES D 570 Review of Literature Seminar (1, max. 6) Continuous weekly seminar devoted to a review of restorative and related literature, and discussion of teaching methods, philosophy of teaching and treatment. Offered: AWSp.

RES D 580 Restorative Treatment Planning Seminar (1-, max. 8) Continuous weekly seminar to discuss controversial treatment problems and difficult diagnostic cases selected for graduate students. Offered: AWSp.

RES D 585 Advanced Dental Materials Science (2) Advanced concepts of dental materials science including physical, mechanical, chemical, and biological properties of restorative dental materials. Emphasis also on research design, testing methods, and proper selection of dental materials for clinical practice. Offered: W.

RES D 588 Masticatory Functional Analysis and Occlusal Adjustment (2) Lecture/seminar and clinical sessions in the study of the physiology of occlusion. Pertinent literature reviewed and discussed from the multidisciplinary viewpoint. The clinical sessions include training in masticatory functional analysis and treatment of occlusally related diseases. Offered: A.

RES D 589 Review of Literature in Occlusion (2) Seminar to review pertinent literature in occlusion. Offered: S.

RES D 590 Fundamentals of Fixed Prosthodontics (2-, max. 4) Lecture/laboratory/clinical sessions in the study of gnathological principles and procedures as they pertain to the treatment of comprehensive cases assigned to the students. Use and application of several articulators. Offered: A.

RES D 600 Independent Study or Research (*) Prerequisite: permission of graduate program adviser. Offered: AWSpS.

RES D 620 P-Comprehensive Treatment Planning in Restorative Dentistry (3) Orientation to restorative clinical operations, administrative procedures associated with patient management and completion of initial treatment plans. Emphasizes problem-based learning, treatment outcomes, the sequence of clinical treatment, and the diagnosis and management of caries-susceptible patients. Offered: S.

RES D 630 P-Clinical Restorative Dentistry ([1-3]-, max. 9) Clinical training in fundamental restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

RES D 635 Clinical Restorative Dentistry (3) Verhoef Knowledge and experience in the diagnosis and restoration of diseased, damaged, unesthetic, or missing teeth. Experience in management of complex, inter-disciplinary treatment plans. Skills in patient communication and management. Utilization of broader range of restorative materials and techniques.

RES D 640 P-Advanced Clinical Restorative Dentistry ([1-3]-, max. 12) Clinical training in restorative dentistry procedures, including diagnostic, treatment planning, and therapeutic aspects of operative dentistry, fixed prosthodontics, and occlusal treatment. Offered: AWSp.

RES D 650 Restorative Dentistry Clinical Elective (1-6, max. 12) Elective offering in

clinical areas related to discipline. Offered: AWSpS.

RES D 659 P-Restorative Dentistry Extended Learning (*, max. 4) Supplemental work in restorative dentistry to correct an area of student deficiency. Credit/no credit only. Offered: S.

RES D 660 Oral Rehabilitation ([1-6]-, max. 32) Clinical course to provide experience in diagnosis and treatment of patients requiring restorative procedures from single restorations to complex oral rehabilitative methods. Special emphasis is directed toward the integration of periodontics and occlusion as they relate to restorative dentistry. Offered: AWSpS.

RES D 665 Clinical Practice Teaching (1, max. 4) Supervised experience in teaching clinical fixed prosthodontics to undergraduate dental students. Offered: AWSpS.

College of Education

Curriculum and Instruction

EDC&I 324 Physical Education and Health in the Schools (2) Techniques and procedures for teaching physical education and health in elementary and secondary schools. For students in Teacher Education Program. Credit/no credit only.

EDC&I 341 The Teaching of Art in the Secondary School (3) For majors in secondary art education planning to teach on the junior or senior high school level.

EDC&I 353 Teaching in the Elementary School (3) Emphasizes selected teaching modes; lesson planning; classroom management procedures; grouping to accommodate pupils with special needs; utilization of learning resources; evaluation of teaching. Attention also given to school culture.

EDC&I 354 Teaching in the Secondary School (3) Development of basic skills in instructional methods, lesson planning, classroom management procedures, evaluation of teaching. Attention also given to school culture.

EDC&I 355 Language Arts in the Elementary School (3) Basic course in planning and teaching elementary language arts: listening and speaking, written composition, handwriting, spelling, creative and practical writing.

EDC&I 356 The Teaching of English (3) Combines theoretical understanding of teaching with specific techniques and materials for literature, language, composition, and mass media at the secondary level; coordinated with concurrent experience in schools.

EDC&I 357 The Teaching of Speech (3) Special methods course in the teaching of speech communication at the elementary and secondary levels.

EDC&I 360 Reading in the Elementary School (3) Basic course in methods, techniques, and materials used the teaching reading through decoding, comprehension, strategies, and literature in primary and intermediate grades.

EDC&I 424 Multiethnic Curriculum and Instruction (3) Primarily for preservice and in-service teachers who have little or no previous exposure to issues related to ethnicity and schooling. Designed to help teachers better understand the school's role in the ethnic education of students and acquire the insights, understandings, and skills needed to design and implement curricular and instructional strategies that reflect ethnic diversity.

EDC&I 425 Instructional Strategies for Minority Students (3) Designed to equip educators with appropriate skills in effective teaching of culturally and socioeconomically different students. Attention is directed to understanding how these students differ from

mainstream youth and what the implications are for instructional strategies in the classroom.

EDC&I 434 Introduction to Computers in the Classroom (3) Overview of the uses of computers in education. Uses of computers in instruction, classroom management (gradebooks, utilities), evaluation of software, overview of programming, and word processing. Prior experience not required.

EDC&I 436 Design and Authoring of CAI (3) Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with T C 436.

EDC&I 437 Uses of Computer Application Packages in Schools (3) Introduction to the instructional and management uses of application programs. Topics may include: databases, spreadsheets, word processing, graphics packages, graphing utilities, telecommunication, desktop publishing. Emphasis is on K-12 setting. Prerequisite: EDC&I 434.

EDC&I 440 Gender and Education (5) I&S Gender bias, discrimination, and gender-equity efforts in education. Includes curriculum instruction, instructional materials, testing, counseling, athletics, teacher education, educational employment issues, and sexual harassment. Relevant federal and state laws, court decisions, and strategies for promoting gender equity also addressed. Recommended: WOMEN 200 or SOC 110. Offered: jointly with WOMEN 415.

EDC&I 443 Improvement of Teaching: Elementary School Music (3) Advanced studies in the teaching of music in the elementary school. For experienced teachers.

EDC&I 451 Second Language Acquisition and Language Study (3) *Stritikus, Varghese* Identifies the major theories, concepts, processes, and factors pertinent to learning a second language, especially in relation to English. Relates second language acquisition theories, concepts, processes, and factors to pedagogical implication for classroom teaching.

EDC&I 452 Approaches to Assessing Second Language Students in K-12 Schools (3) *Stritikus, Varghese* Examines the multiple ways of assessing linguistically diverse students in K-12 schools, including standardized and alternative assessments of these students. Prerequisite: EDC&I 457.

EDC&I 453 Teaching the Bilingual-Bicultural Student (3) Educational needs of bilingual students: research findings, special programs, materials, and methodologies that bilingual-bicultural education can provide to meet those needs. Cultural combinations of bilingual populations in American culture; historical, social,

and linguistic factors affecting their K-12 education.

EDC&I 454 Cooperative Learning in the Classroom (3) Theory and research on cooperative learning and current practices of managing such learning. Team learning activities and opportunities to plan and try out lessons and materials using several different cooperative strategies. Credit/no credit only.

EDC&I 455 The Language Arts: Language and Learning (3) The teaching of language arts requires research-based knowledge of language learning and its influence on listening, speaking, reading, writing, and nonverbal communication. Emphasizes techniques for building both a solid literacy curriculum and sound instructional practices.

EDC&I 456 Workshop in Instructional Improvement: Language Arts (1-6, max. 15) Individual or group study projects on the improvement of instruction in language arts.

EDC&I 457 Methods in Teaching English as a Second Language (3) Prepares preservice and in-service teachers to teach English as a second language and to meet the educational and linguistic needs of students who have little or no English language skills. Emphasis on a survey of first- and second-language acquisition research and its educational implications, as well as instructional strategies consistent with the audiolingual, cognitive, and creative construction approaches to second-language learning. Includes diagnostic-prescriptive strategies for classroom application.

EDC&I 458 Content Area ESL Instruction (3) *Stritikus, Varghese* Exposes students and engages them in how to support their English Language Learners in their content areas through sheltered instruction, specifically through the framework, Sheltered Instruction Observation Protocol (SIOP). Focuses specifically on the academic language needs of these students. Prerequisite: EDC&I 457.

EDC&I 459 Workshop in Instructional Improvement: Reading (1-6, max. 15) Projects on the improvement of instruction in reading. For experienced teachers and students in Teacher Education Program.

EDC&I 460 Early Literacy Instruction (3) Theory, research, and practice in early literacy acquisition including emergent literacy, phonemic awareness, word identification, comprehension, invented spelling, and writing. Emphasis on classroom instruction strategies for first and second language learners. Offered: A.

EDC&I 461 Materials for Teaching Reading: Children's and Young Adult's Literature (3) Designed to provide acquaintance with materials used in the teaching of reading. Trade books and materials from content areas are examined.

EDC&I 462 Reading Comprehension Instruction in Elementary and Secondary School (3) Research-based practices for explicit teaching of reading comprehension of both fiction and content-area texts including issues of reading strategies, text difficulty, teacher modeling, guided reading, discussion, assessment, and adaptations for struggling students. Offered: Sp.

EDC&I 463 Hands-On Science for Elementary School Teachers (5) Offers prospective and practicing teachers an opportunity to learn science through the hands-on teaching methods recommended for teaching science at the elementary level. Offered: jointly with MBT 463.

EDC&I 464 Educating Native-American Youth (3) Assists students in understanding the North American Indian child from cultural, socioeconomic, and psychological points of view. Provides opportunities for the student to apply knowledge and skills gained in other courses to prepare programs and learning aids relevant to the educational situation of the Indian child.

EDC&I 465 Social Studies Education: Elementary School Programs and Practices (3) Stresses curriculum patterns, instructional procedures, resource materials, and the selection of content in social studies. For elementary and middle school teachers and students in Teacher Education Program.

EDC&I 466 Social Studies Education: Secondary School Programs and Practices (3) Stresses curriculum patterns, instructional procedures, resource materials, and a selection of content in social studies for middle, junior, and senior high school teachers. For experienced teachers and students in Teacher Education Program.

EDC&I 467 Geography in the Social Studies Curriculum (3) I&S Discussion of the concepts and content of geography essential to effective social studies curricula. Offered: jointly with GEOG 467.

EDC&I 468 Workshop in Instructional Improvement: Social Studies (1-6, max. 15) Individual or group study projects on the improvement of instruction in social studies.

EDC&I 469 Teaching African American Students and Culture (3) Examination of sociocultural and pedagogical factors that influence African American students' learning styles, opportunities, and outcomes; exploration of ways to reform teaching techniques to better accommodate cultural styles and experiences to improve the educational achievement of African American students.

EDC&I 470 Science Education: Elementary School Programs and Practices (3) Designed for classroom teachers with reference to the teaching and learning of science from kindergarten through grade 6. Emphasis is placed on objectives, methods, and materials as related to the concepts and processes of science.

EDC&I 471 Science Education: Secondary School Programs and Practices (3) Survey of the status and potential role of science in education; trends and their implications for the teaching of both biological and physical sciences in the junior and senior high schools; representative curricula and related teaching procedures; the psychology of concept formation and problem solving; and organization of science programs.

EDC&I 472 Environmental Education for Teachers (3) Status, selected problems, and role of environmental education in program of elementary, middle, and junior high schools. Opportunity to examine and receive instruction in use of existing environmental education instructional materials. Instruction is in the spirit of inquiry/discovery.

EDC&I 473 Workshop in Instructional Improvement: Science (1-6, max. 15) Individual or group study projects on the improvement of instruction in science.

EDC&I 474 Multi-Ethnic Studies: Methods, Content, and Materials (3) Designed to help preservice and in-service teachers identify content and materials and devise methods for implementing ethnic studies programs and for incorporating ethnic content into regular K-12 social studies, language arts, and humanities curricula. Special attention is given to teaching about American Indians, Mexican Americans, African Americans, Asian Americans, Puerto Rican Americans, and White ethnic groups.

EDC&I 475 Improvement of Teaching: Elementary School Mathematics (3) Designed for elementary teachers. Emphasis is placed on the contributions of research to the improvement of the teaching of mathematics in the elementary school. For experienced teachers.

EDC&I 476 Improvement of Teaching: Junior High School Mathematics (5) Exploration of mathematical concepts for the purpose of improving the teaching of middle school mathematics.

EDC&I 477 Improvement of Teaching: Secondary School Mathematics (5) Exploration of mathematical concepts for the purpose of improving the teaching of secondary-school mathematics. For experienced teachers.

EDC&I 478 Special Topics in Mathematics for Teachers (2-9, max. 9) NW Study of selected areas of mathematics. Designed for the improvement of teachers of mathematics. Offered: jointly with MATH 497.

EDC&I 479 Workshop in Instructional Improvement: Mathematics (1-6, max. 15) Individual or group study projects for the improvement of instruction in mathematics.

EDC&I 482 Educational Technology in Schooling (3) Introduction to the application of technologies (computers, telecommunications, interactive video) in schools. Designed primarily for pre- and in-service teachers, but of interest to anyone involved in technology in education.

EDC&I 485 Workshop in Instructional Improvement: Educational Communication and Technology (2-6, max. 6) Individual or group study projects on the improvement of instruction through use of educational communication and technology.

EDC&I 488 Educational Technology and Learning in Alternative Settings (3) How educational technology can be used to encourage learning in nonschool environments, such as museums, radio and television broadcasts, parks and recreation centers, and distance education programs. Students investigate one of these areas and prepare a project.

EDC&I 494 Workshop in Improvement of Curriculum (1-6, max. 15) Stresses the application of procedures for curriculum development, maintenance, and evaluation. Opportunities furnished to develop and perfect strategies for program development with occasions given to utilize the strategies in master plan and materials preparation for simulated or real school situations. Specific focus of workshop is determined by instructor or by arrangement with district.

EDC&I 495 Workshop in Improvement of Teaching: Selected Topics, Issues, or Problems (1-6, max. 15) Individual or group projects to help teachers adapt instruction to selected topics, issues, or problems and to identify the approaches and instructional resources that provide the soundest learning experiences.

EDC&I 496 Workshop in Instructional Improvement (2-6, max. 6) Individual or group study projects on the improvement of instruction with attention to designing instructional plans.

EDC&I 499 Undergraduate Research (2-5, max. 5) Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDC&I 500 Field Study (1-10, max. 10) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Curriculum and Instruction in the College of Education.

EDC&I 505 Seminar in Curriculum and Instruction (1-3, max. 15) Seminar on advanced topics in curriculum and instruction. Critical examination of current research and practice. Content varies, check quarterly Time Schedule for topics to be covered. Prerequisite: permission of instructor.

EDC&I 510 History of Educational Technology (3) Examines the role of technology in education through history. Early systems of instruction, advent of textbooks, models for school architecture, instructional devices and teaching machines, mediated and distance learning. Focuses on the interplay between designed educational approaches and contexts in which they were implemented, and consequent success for failure.

EDC&I 511 Current Issues in Technology and Education (3) Examines current genres of learning technology, novel approaches for integrating technology into curriculum and instruction, and recent theoretical perspectives that inform future work in educational technology. Prerequisite: EDC&I 510 or instructor permission.

EDC&I 512 Survey of Educational Technology Research (2, max. 4) Critically examines active research projects in educational technology. Critiques of research practice. Corequisite: EDC&I 511 and EDC&I 580.

EDC&I 524 Seminar in Teacher Education (3, max. 6) Focus on recent research, issues, and proposals for future development in teacher education, certification, and continuing professional growth. Alternate year offering focuses on either preservice or inservice issues. Prerequisite: permission of instructor.

EDC&I 530 Approaches to Literacy Instruction (3) Designed to aid experienced teachers who possess background in the teaching of literacy, this course presents a variety of approaches and actual analysis of approaches. Prerequisite: teaching experience and a basic course in the teaching of reading.

EDC&I 531 Seminar: Critical Review of Literacy Materials (3) Students formulate and apply criteria for assessing materials, with emphasis on linguistic, cultural, and psychological factors; instruction effectiveness, interest level; and educational objectives. Prerequisite: teaching experience and one basic course in the teaching of reading.

EDC&I 532 Seminar in Literacy Research (3, max. 9) Primary focus on those aspects of the literacy process that are of concern in a developmental literacy program. Emphasis on research design, evaluation of research, and research findings, dealing with factors influencing literacy ability, problems in skill development, recreational reading, and writing. Prerequisite: permission of instructor.

EDC&I 533 Seminar: Conducting Research in Reading (3, max. 6) Students design and conduct original research studies in the field of reading. Emphasis on research rationale, choice of productive research types, and reporting of research results and implications. Prerequisite: EDC&I 532.

EDC&I 534 Seminar in the Reading of Literature (3) Reading of literature and its effect on reading skills, language development, social values, and literary judgment of children and adolescents. Emphasis on analysis of research in these areas and on the development of action research designed to study response to literature. Prerequisite: one 400- or 500-level education curriculum and instruction course in reading or language arts or one graduate course in literature for children or young adults.

EDC&I 535 Seminar: Conducting Research in Response to Literature (3, max. 6) Students design, conduct, and interpret original research studies in the field of reading literature within the context of the school curriculum. Emphasis on the analysis of literary content and structure and the relationship of those qualities to the literary experience. Prerequisite: EDC&I 534.

EDC&I 536 Inquiry and Methods in Writing Instruction (3) *Troia* Covers methods of assessment and teaching written composition, spelling, and handwriting to children and youth with, and without, disabilities. Particular attention is given to how to establish a strong writing program in elementary classrooms and how to teach writing strategies. Offered: jointly with EDSPE 528; Sp.

EDC&I 541 Seminar in Bilingual Education: Organization and Structure (4) Study of the structure and organization of bilingual programs. Includes study of the developmental and organizational factors affecting bilingual education. Assists graduate students in reviewing the historical antecedents in bilingual education and in developing a personal philosophy about bilingual education.

EDC&I 542 Seminar in Bilingual Education: Instructional Foundations and Issues (4) Study of the theoretical foundations and instructional implications of psychology and

linguistics as they apply to bilingual education. Assists graduate students in exploring learning styles of bilingual children and in becoming familiar with the crucial issues in bilingual education.

EDC&I 543 Seminar in Bilingual Education: Instructional Strategies (4) Study of instructional factors affecting bilingual education. Particular emphasis is given to research related to the variables involved in teaching in a bilingual environment. Assists graduate students in exploring instructional methodologies and formats as they apply to bilingual education and in becoming familiar with the current issues in bilingual education.

EDC&I 544 Immigration and Education: Immigrant Student Perspectives (3) *Stritikus, Varghese* Examines the multitude of factors which shape the immigrant student experience in U.S. schools. Takes an interdisciplinary perspective drawing on research from sociology, anthropology, and education, to understand teaching and learning from the perspective of immigrant students.

EDC&I 545 Multilingual Socialization and Development (3) *Stritikus, Varghese* Explores the research base examining second language acquisition, in and out of school contexts. Focuses on the home language practices of linguistically diverse students with the purpose of understanding how these processes influence school learning.

EDC&I 547 Sociolinguistics (3) *Stritikus, Varghese* The study of language in its social context and the study of social life through language. Explores issues in the field of sociolinguistics and sharpens tools to explore educational issues related to linguistic and cultural diversity. Prerequisite: EDC&I 453 or equivalent.

EDC&I 550 Educational Technology Research (3) Analysis, critique, and practical experience with research studies of all types (experimental, ethnographic, evaluation) concerning questions of interest to educational technologists. Prerequisite: EDC&I 480, a research methods course, or permission of instructor.

EDC&I 551 Introduction to Instructional Design (3) An experimental course in analyzing, designing, developing and formatively evaluating instructional products using the Instructional Systems Design (ISD) Mode. Also, discussion of how to successfully implement an instructional product/program within an organization using change management principles. Business and industry training focus.

EDC&I 552 Management of Educational Technology Programs (3) Factors contributing to effective management of programs incorporating educational technology and microcomputers. Manager's role as agent of instructional change and processes leading to successful adoption and long-term implementation of a new instructional system. Prerequisite: EDC&I 510.

EDC&I 553 Seminar on Instructional Systems Development (3) Critical analysis of processes involved in the development of instructional systems. Prerequisite: EDC&I 481 or permission of instructor.

EDC&I 555 Educational Futures (3) Concept of alternative futures stressing manageability of the future. Attention is given to current and future

events that can or might impact education. Basic future studies methods are considered with opportunities to apply such methods within educational arena. Prerequisite: prior graduate course work or experience in education.

EDC&I 558 Secondary School Curriculum (3) Systematic analysis of current curriculum practices, with particular emphasis on the social and historical forces affecting secondary-school curriculum.

EDC&I 559 Principles and Procedures of Curriculum Development (3) Intensive study of basic principles and procedures utilized in development of curricula. Participants have opportunities to apply such procedures in class activities. Attention given to curriculum foundations.

EDC&I 561 Seminar in Language Arts (3) Study of language with special attention to research pertaining to the social context of language in the classroom. Course work includes group and individual analysis of language arts studies with attention to research design and measurement. Prerequisite: EDC&I 455.

EDC&I 562 Seminar in Reading and Language Arts: Secondary Emphasis (3) Study of recent research in listening, oral language, reading, and written language, emphasizing psychological and interrelated aspects. Prerequisite: permission of instructor.

EDC&I 563 Current Issues in Literacy Education (1-3, max. 6) Discussion of problems and issues of current interest and importance in language arts education. Prerequisite: EDC&I 561.

EDC&I 565 Seminar in Social Studies Education: Elementary Emphasis (3) Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 465 or equivalent.

EDC&I 566 Seminar in Social Studies Education: Secondary Emphasis (3) Intensive study of the social studies curriculum, with particular emphasis on current literature and research. Prerequisite: EDC&I 466 or equivalent.

EDC&I 567 Current Issues in Social Studies Education (1-3, max. 6) Discussion of problems and issues of current interest and importance in social studies education.

EDC&I 569 Educating Ethnic Minority Youths (4) Intensive analysis and review of the research and curricular programs related to the social, psychological, and political factors that influence the school experiences of ethnic minority youths. Special attention given to instructional and curricular programs for African-American, American-Indian, Mexican-American, Puerto Rican-American, and Asian-American students. Prerequisite: graduate standing or permission of instructor.

EDC&I 570 Seminar in Science Education: Elementary Emphasis (3) Investigation of curriculum and instruction in science at elementary-school levels, with particular emphasis on current literature and research. Prerequisite: EDC&I 470 or equivalent.

EDC&I 571 Seminar in Science Education: Secondary Emphasis (3) Investigation of curriculum and instruction in science at secondary-school levels, with particular

emphasis on current literature and research. Prerequisite: EDC&I 471 or equivalent.

EDC&I 572 Current Issues in Science Education (1, max. 6) Discussion of topics and problems of current interest and importance in science education. Prerequisite: graduate standing.

EDC&I 573 School Reform and Multicultural Education (3) Similarities and differences among the visions, goals, and strategies of proposals for school reform and multicultural education are analyzed; implications for practice in curriculum and instruction are deduced from these analyses. Prerequisite: one course in multicultural education or permission of instructor.

EDC&I 574 Race, Gender, and Knowledge Construction: Curriculum Considerations (3) Using historical and contemporary perspectives, considers ways in which knowledge related to race and gender has been and is constructed and the implications of ways in which knowledge is constructed for curriculum reform and teaching. Prerequisite: one course in ethnic studies, multicultural education, or women studies or permission or instructor.

EDC&I 575 Seminar in Mathematics Education: Elementary Emphasis (3) Investigation of curriculum and instruction in mathematics at the elementary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

EDC&I 576 Seminar in Mathematics Education: Secondary Emphasis (3) Investigation of curriculum and instruction in mathematics at the secondary-school level; review of research and preparation of proposals. Prerequisite: graduate standing.

EDC&I 577 Current Issues in Mathematics Education (1, max. 6) Discussion of problems and issues of current interest and importance in mathematics education. Prerequisite: graduate standing.

EDC&I 578 Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second-year doctoral standing and one course in statistics. Offered: jointly with EDPSY 586.

EDC&I 579 Qualitative Methods of Educational Research (-5) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second-year doctoral standing and one course in statistics. Offered: jointly with EDPSY 587.

EDC&I 580 Technology in Context (3) Focuses on development of appropriate methods and concepts for research on technology in schools, workplaces, and other naturalistic settings. Fieldwork exercises and reading exemplary studies from multiple disciplinary perspectives. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, or permission of instructor.

EDC&I 581 Cognitive Systems Design (3) Covers the design of applied technology-based learning systems, informed by current views of learning, technology, and cognition. Emphasizes synthesizing students' knowledge of technology, learning and research in collaborative settings. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, or permission of instructor.

EDC&I 582 Design Experimentation and Implementation in Context (3) Introduces theoretical, methodological, and practical issues involved with studying the designed use of learning technologies in real world settings. Focuses on engaging in empirical study of the designed system through partnerships involving education researchers, educators, and technologists. Prerequisite: EDC&I 510, EDC&I 511, EDC&I 512, EDC&I 580, EDC&I 581, or permission of instructor.

EDC&I 583 Message Design (3) Research and theory on design of instructional messages in various modalities (visual, auditory), and in various formats (pictorial, verbal, graphic). Prerequisite: EDC&I 480 or permission of instructor.

EDC&I 584 Instructional Graphics for Microcomputers (3) Study of current research on instructional uses of computer graphics. Development, selection, and application of design principles for graphically-based instructional and training programs. Prerequisite: EDC&I 436, EDC&I 481.

EDC&I 585 Technology and the Culture of Education (3) Social impact of technology on education in the United States and elsewhere: social, political, and cultural factors affecting educational communication and technology; roles and relationships among instructors and learners; appropriate technology in developing countries; technology's long-term influence on thought and values. Prerequisite: EDC&I 480 or permission of instructor.

EDC&I 586 Current Issues for Computers in the Classroom (1, max. 6) Addresses many of the current topics in computer-related education. Issues and research related to computer uses in curriculum, instruction, and management of instruction.

EDC&I 587 Design and Application of Interactive and Immersive Instructional Systems (3) Theoretical and empirical questions involved in design of interactive instructional systems using such technologies as virtual reality and CAI. Specific problems inherent in design of complex learning environments: immersion, control, structure, sequence of experiences, navigation, learner guidance. Educational uses of systems. Prerequisite: EDC&I 481 or EDC&I 583, EDC&I 436, or permission of instructor.

EDC&I 588 Seminar: Computers in Education (3) Provides opportunity for graduate students to analyze, discuss, and design research in areas of computers in education. Includes historical development of research in this area as well as a platform for the development of research proposals and refinement of ongoing research. Prerequisite: EDC&I 434 or EDC&I 436.

EDC&I 589 Current Issues in Educational Communications (1, max. 9) Discussion of problems and issues of current interest and importance in the field of educational communications. Serves also as a forum for discussion of doctoral research. Designed for master's and

doctoral candidates in educational communications. Credit/no credit only. Prerequisite: graduate standing.

EDC&I 590 Seminar in Elementary Education (3) Exploration of the philosophy, history, purposes, curriculum, methods, and school organization of elementary education. Prerequisite: elementary-school teaching experience, EDC&I 556.

EDC&I 591 Seminar in Curriculum Research (3) Analysis of past and current empirical, historical, ethnographic research, and philosophical analysis of the curriculum field. Studies considered include research in curriculum development, the curriculum plan, contextual characteristics, and factors related to curriculum participants. Group and individual analyses focus on theory generation and practical applications of research. Prerequisite: EDC&I 559 or permission of instructor.

EDC&I 592 Seminar in Secondary Education (3) Research and study of secondary education. Primary focus on factors involving change in secondary-school curriculum and organization. Prerequisite: EDC&I 558.

EDC&I 593 Seminar in Curriculum: Theory and Practice (3) Investigation of curriculum theory and practice. Consideration is given to theoretical writings that address the relationships between various curricular variables. Theoretical positions are related to curricular practices and innovations. Prerequisite: EDC&I 559.

EDC&I 594 Seminar in Curriculum: Issues, Systems, Models (3) Emphasis on the current approaches to curriculum and curriculum innovation. Attention is given to major educational issues as they affect curricular activity. Prerequisite: EDC&I 559.

EDC&I 595 Seminar in Analysis of Teaching (3) Investigation of the ways in which classroom teaching has been analyzed from a variety of disciplinary perspectives. Focus on methods, findings, and implications of research on teaching. Prerequisite: teaching experience.

EDC&I 596 Seminar in Strategies of Instruction (3) Various instructional models applicable to all levels of schooling. Theoretical and philosophical bases for these instructional models are considered.

EDC&I 597 Curriculum Evaluation Seminar (3, max. 6) Focuses on the evaluators' roles, evaluation theory and models, and selected curricular evaluations. Examples are drawn from the several disciplines commonly offered in the elementary and secondary schools. Students are expected to identify an evaluation problem and to develop an evaluation design that can be implemented as a practical solution to the problem. Prerequisite: EDC&I 559 and permission of instructor.

EDC&I 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Prerequisite: permission of instructor.

EDC&I 600 Independent Study or Research (*) Prerequisite: permission of instructor.

EDC&I 601 Internship (1-10, max. 10) Credit/no credit only. Prerequisite: graduate standing and permission based on approval of proposal submitted during quarter preceding the internship.

Education

EDUC 301 Introductory Practice in Community Service Activity (1-10, max. 10) Observation and participation in a variety of activities in a K-12 classroom. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

EDUC 305 The Purpose of Public Schools in a Democracy (5) I&S Explores issues and questions pertaining to public schools in a democratic society through directed readings, dialogue, individual and group projects designed to engage students with a series of crucial issues in public schools.

EDUC 310 Current Issues in Education (5, max. 10) I&S Covers a current issue and provides the opportunity to read and discuss educational issues with other students and faculty and to learn of opportunities in the College of Education programs.

EDUC 401 Practicum in Community Service Activity (1-18, max. 18) Tutoring and teaching experiences in a school or community service organization. Placement made according to participant interests and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions are required. Offered: AWSp.

EDUC 402 Practicum in Classroom Teaching and Management: Primary (1-18, max. 18) Tutoring and teaching experiences in a primary school setting (grades K-3). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions. .

EDUC 403 Practicum in Classroom Teaching and Management: Intermediate (1-18, max. 18) Tutoring and teaching experiences in an intermediate school setting (grades 4-8). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions. .

EDUC 404 Practicum in Classroom Teaching and Management: Secondary (1-18, max. 18) Tutoring and teaching experiences in an intermediate school setting (grades 6-12). Placements made according to participants interest and needs. Participation on a predetermined schedule plus scheduled orientation and debriefing sessions.

EDUC 502 Advanced Practicum in Classroom Teaching and Management (1-18, max. 18) In-depth classroom practicum experiences to certificated teachers working on additional endorsements. Arrangements must be made prior to enrolling with an adviser in the Teacher Education Office. Offered: AWSpS.

EDUC 700 Master's Thesis (*) Prerequisite: permission of faculty adviser and graduate program coordinator. Offered: AWSpS.

EDUC 800 Doctoral Dissertation (*) Prerequisite: permission of supervisory committee chairperson and graduate program coordinator. Offered: AWSpS.

Educational Leadership and Policy Studies

EDLPS 444 Constitution and American Public Education (3-6, max. 6) I&S Emphasis on the principles, processes, and content of constitutional law in an effort to provide new insights and new tools with which school administrators and teachers may examine questions involving political and civil rights in the United States, especially as these affect the conduct of education. Specific topics on constitutional freedom include the obligation to go to school; legal controls over curriculum, teachers, and students; and racial integration and equal financing of public schools. Open to law students and to nonlaw students enrolled as graduate students or as upper-division undergraduates. Credit/no credit only. Offered: jointly with LAW 444.

EDLPS 458 History of American Education to 1865 (3) I&S Development of American education in cultural context; colonial period, influence of Enlightenment, and common school movement. Offered: jointly with HSTAA 458.

EDLPS 459 History of American Education Since 1865 (3) I&S Development of American education in cultural context: progressive education, recent criticism, continuing issues and trends. Offered: jointly with HSTAA 459.

EDLPS 479 Crucial Issues in Education (3) Selected educational issues, policies, and contexts. Evolution of the American education enterprise, legal issues, professionalism, finance, and other vital educational concerns.

EDLPS 496 Workshop: Education Programs and Problems (1-6, max. 12) Study of such topics as planning, development, supervision, organization, operation, or evaluation of current or emerging programs or problems in education.

EDLPS 499 Undergraduate Research (*) Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program.

EDLPS 501 Introduction: Leadership Beyond the Classroom (3-6, max. 6) First course in principal certification program; explores Washington state laws, legal principles, context of public schools, multicultural issues, changing population. Essential skills of leadership: communication, human relations, strategies for shared decision making, and dealing with conflict. (Open only to students admitted to the EDLPS Principal/Program Administrator Preparation Program.).

EDLPS 502 Leadership Core ([3-6, max. 6]-) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS 503 Leadership Core ([3-6, max. 6]-) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS 504 Leadership Core ([3-6, max. 6]) Topics include moral dimensions of leadership; modes of inquiry; organizational theory and change; history of educational reform; curriculum deliberation and instructional leadership and supervision; school-centered inquiry and decision-making; policy, planning, and program evaluation; issues on diversity and multicultural education; American and Washington State school law; school finance and resource allocation; school-community relations. Instruction occurs in units and seminar throughout the academic year. Prerequisite: admission to Principal/Program Administrator Preparation Program.

EDLPS 505 Transition to Leadership (3-6, max. 6) Development and administration of systems for selection, evaluation and clinical supervision of certificated and classified personnel. Focuses on leadership models and transition to a leadership role, including opening a school or program and dealing with student/school crises. (Only for students admitted to the EDLPS Principal/Program Administrator Program.).

EDLPS 507 Reflective Seminar (1-6, max. 6) Integration of theory and internship experience; group process laboratory and peer feedback and review of written work, oral presentations, and journals. Reading and discussion of crucial issues. (Only for students admitted to the EDLPS Principal/Program Administrator Preparation Program.) Credit/no credit only.

EDLPS 509 Planning, Organizing, and Decision Making (3) Application of principles utilized in planning, organizing, and decision making in districts and schools. Formation of policy and procedures; formal and informal organization; power, authority, and responsibility; utilization of people, time, and space.

EDLPS 510 School Finance (3) Financial practices and problems in districts and schools considered, including state and federal support plans, school plant planning, school business management, resource allocation, and budgeting and educational accountability.

EDLPS 511 School-Community Relations (3) Examines the dynamics of the interface between the public schools and the community. Special attention is given to the findings of research in relation to school-community power, types, and organizational influences.

EDLPS 512 Seminar in Personnel Administration and Development (3) Major emphasis on the analysis of factors to be considered in the selection and evaluation of teachers and administrators and considerations in staff development.

EDLPS 513 Seminar in Instructional Development and Supervision (3) Theory of the process of supervising instructionally effective school personnel, including an analysis of the techniques of supervision, theory of leadership and group process, interpersonal relations, and evaluation of teacher effectiveness.

EDLPS 514 Washington School Law (3) Overview of Washington State specific legal provisions affecting the operations and management of public schools, including school organization and operations, school finance, separation of church and state, school employment, student conduct, discipline and rights, equity, intergovernmental agreements, and student health and safety. .

EDLPS 515 Management of Labor Relations in Education (3) Examination of procedures and techniques pertinent to the management of organizational conflict. Among the areas covered are collective bargaining, grievance procedures, mediation, fact finding, and arbitration.

EDLPS 516 Special Education and the Law (3) Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis upon procedural and substantive rights of children with disabling conditions. Offered: jointly with EDSPE 504; W.

EDLPS 517 Seminar in Administration: Facilities (3) Contemporary issues, problems, and techniques of educational facility administration. Emphasis placed on such factors as planning, financing, development, design, construction, operation, liabilities, property management, state regulation. Credit/no credit only.

EDLPS 518 Reflective seminar: The Superintendency (1-6, max. 6) Integration of theory and internship experience. Readings and discussion of crucial issues, presentations by local school superintendents: district budgeting processes, personnel, staff relations and collective bargaining, superintendent-board relations, bond issues, facilities planning, superintendent as instructional leader. Credit/no credit only.

EDLPS 519 Special Topics in Educational Leadership (1-10, max. 15) Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues of particular concern to K-12 administrators and other educators in leadership roles in districts and schools. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 520 Education as a Moral Endeavor (3) An exploration of fundamental questions that have faced educational leaders in the past and most likely will continue to face them in the future. Foundational studies in history, philosophy, and sociology provide the basis for discussion and writing about these fundamental questions. Credit/no credit only.

EDLPS 521 Philosophy of Education (3) Philosophy of education considered as a study of the conceptual basis for educational policy and practice. Emphasis on relationships between enduring educational problems and fundamental philosophic issues; concepts that feature centrally in educational discourse; and conceptual analysis as a means for clarifying decisions regarding educational policy and practice.

EDLPS 522 Contemporary Philosophies of Education (3) Intensive study of the writings of selected contemporary philosophers of education.

EDLPS 523 Analysis of Educational Concepts (3) Selected concepts central to conduct and understanding of education.

EDLPS 524 Seminar in Philosophy of Education (3, max. 6) Philosophical examination of ways in which education might be studied. Uses and limits of conventional scientific approaches in education inquiry. Consideration of alternatives.

EDLPS 525 Educational Inquiry (3) General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowledge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

EDLPS 526 Educational Inquiry (3) General survey of epistemological issues underlying the several schools of thought or families of inquiry. Overview of various methods used in conduct of educational inquiry, examples of ways those methods are typically used, and exploration of strengths and weaknesses of those methods. Discussion throughout is in terms of assumptions regarding the nature of knowledge and purposes of inquiry. Must be taken in sequence. Credit/no credit only. Prerequisite: doctoral status in education.

EDLPS 530 History of Education (3) Historical survey of education. Emphasis on relationship between idea and practice. Topics include education and colonialism, formation of state school systems, progressive education, equal educational opportunity, changes in textbooks and curricula, education and social structure, and education in the history of cultures.

EDLPS 531 History of American Higher Education (3) Examination of the historical development of the American higher education enterprise, including pre-colonial origins. Includes attention to the colonial colleges, the rise of new institutions in the nineteenth century, and the further development of American colleges and universities in the twentieth century. Leaders in these developments are identified.

EDLPS 532 Seminar: American Education in the Twentieth Century (3, max. 6) Selected problems in American education over the last century, with special emphasis on contemporary issues and trends.

EDLPS 533 Seminar in Educational Classics (3) Analysis in depth and in the context of the relevant history of several major works in educational thought from Plato to Dewey.

EDLPS 534 History of the Modern University (3) Growth of the modern university with attention to intellectual trends as well as organizational and curricular changes. Special attention is given to nine American universities in the twentieth century.

EDLPS 535 Historical Inquiry in Education Research (3, max. 6) Methods and critique of

historical research in education. Examination of landmark works in education history and historiography. Hands-on experience framing historical questions, finding historical sources, using historical evidence, substantiating historical claims, and addressing issues in the history of education.

EDLPS 536 Historical Analysis of Educational Issues (3) Analysis and interpretation of the history of education in its broadest sense: the transfer of culture across generations. Examination of the problems of evidence and interpretation with which the authors of exemplary works in the history of education struggled.

EDLPS 540 Sociology of Education (3) Examination of education and educational institutions by using the major conceptual tools of sociology. Emphasis on sociological thought and findings that have particular bearing on the understandings and judgments of educators.

EDLPS 541 Topics in Comparative Education (3, max. 6) International efforts in education, including the role of the United States in overseas programs. Analysis of the relation of education and society in foreign areas, stressing social change and conflict. Regions of the world considered in the course vary from one offering to another.

EDLPS 542 Seminar in Educational Sociology (3) Application of sociological principles to school problems; individual problems and investigations. For teachers, administrators, and those using educational sociology as a field for advanced degrees.

EDLPS 543 Seminar: Research in Educational Sociology (3) Theory, concept, and method of sociological inquiry as applied to problems in education.

EDLPS 544 Comparative Education: Introduction to Concepts and Methods (3) Introduction to research methods used in comparative education studies. Considers ways to study familiar and unfamiliar contexts, identifies the common pitfalls of international comparisons. Reviews ethnomethodological tools of interview construction, cross-cultural observation strategies, documentary analysis. Education policy and practice is primary focus; useful for comparing other public policy issues internationally.

EDLPS 545 Knowledge and Data in Relation to Action (3) Introduces L4L students to systematic inquiry—to fundamental ideas about knowing and knowledge, data and evidence, and to the applications of these ideas in settings that invite leadership action to address educational issues. (Only for students admitted to the Leadership for Learning Ed. D. Program.) Credit/no credit only.

EDLPS 546 Leadership Inquiry I: The design of research on Local Problems of Practice (3) Examines evaluation design, action research, critical inquiry, and mixed method research. Equips L4L students to recognize and create viable, rigorous designs for action-oriented research into local problems of practice. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 547 Leadership Inquiry II: Developing Useful Quantitative and Qualitative Evidence (3) Helps students, in the context of action-

oriented research, develop data collection tools, produce high-quality quantitative and qualitative data, and construct evidence for claims the investigator wishes to make. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 548 Leadership Inquiry III: Refining the Design and Analysis of Research that Informs Practice (3) Teaches how to critically evaluate and improve research designs so that they are internally consistent, fully developed, and well-anchored to both substantive and methodological literatures. Builds largely around the students' own emerging dissertation designs. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 549 Special Topics in Educational Studies (1-6, max. 15) Readings, lectures, and discussions pertaining to significant and enduring ideas in the philosophy, history and sociology of education. Specific topics are critically examined in light of contemporary problems in education. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 550 The Dynamics of Educational Organizations (3) Exploration of the literature in organizational theory and leadership, the assumptions that underlie the development of various approaches to organizational theory and how these approaches are applied, and an acquaintance with different conceptual frames that can be used to determine how to improve and change organizations. Credit/no credit only.

EDLPS 551 Foundational Studies in Complex Organizations (3) Examination of conceptual and theoretical bases for complex organizations, characterized by problematic goals, knotty decision-making processes, and fluid participation. Impact of information, power, beliefs, resources, organizational structure, and environment. Although issues discussed are generic, examples focus on educational organizations.

EDLPS 552 Organizational Change in Education (3) Change and innovation in educational organizations. Theoretical approaches include sociopsychological, rational planning, political perspectives, and those associated with notion of organized anarchies. Specific topics related to change and innovation (e.g., roles of beliefs, symbols and norms, diffusion of innovations, and research issues).

EDLPS 553 Human Resources in Educational Organizations (3) Analysis of factors involved in human resource problems related to operation of educational organizations. Motivation, perception, communication, role analysis, and dynamics of groups are studied through use of cases and seminal literature.

EDLPS 554 Foundations I: Leading for Learning in Complex Educational Systems (3) Explores (1) the conceptions of educational leadership as it manifest itself and is exercised in large-scale education systems (districts, regional entities, states); and (2) the possible connections between leadership and learning. (Only for students admitted to the Leadership for Learning Ed. D. Program.) Credit/no credit only.

<EDLPS 555 Foundations II: Moral and Historical Contexts for the Leadership of Complex Educational Systems (2-4, max. 4) Locates system-level educational leadership in a context of values, moral principles, and historical events and trends. Connects leadership to

principles of social justice and enduring dilemmas in public education within a democratic society. (Only for students admitted to the Leadership for Learning Ed. D. Program.) Credit/no credit only.

EDLPS 556 Foundations III: The Dynamics of Organizations, Policy, and Systems Change (2-6, max. 6) Considers the nature and dynamics of organizations within large educational systems. Draws on theories concerning organizations, politics, administration, systems, and innovation. Explores how organizations are designed and function, how policy works, and how systems change, adapt, and learn. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 557 Foundations IV: Fiscal and Legal Contexts for Leadership of Complex Educational Systems (2-5, max. 5) Considers two major challenges facing leaders of complex educational systems: (1) securing and allocating resources (especially funds, but also time and expertise); and (2) conforming to the framework of legal principles and precedents that govern public education. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 560 Perspectives on Policy and Policy Making in Education (3) This course introduces a variety of theoretical perspectives that can be used to analyze policy content, processes and outcomes. Includes a consideration of the power and limits of policy and a discussion of the many ways people in different positions in organizations can influence policy. Credit/no credit only.

EDLPS 561 Education Policies and Leadership in Political Context (3) Systematic consideration of the structure and function of educational policies and problems of research in political context.

EDLPS 562 American School Law (3) Examination of persistent legal issues, including an analysis of how these issues are manifest in public policy debates.

EDLPS 563 Education, The Workforce, and Public Policy (3, max. 6) Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimination issues, and the role of education and training in economic development. Offered: jointly with PB AF 571.

EDLPS 564 Seminar in Economics of Education (3) Current problems in school finance, including costs, ability to support schools, and financial implications of educational principles. The economics of public education. Problems of federal, state, and local school support. Financing capital outlay, research, and public relations.

EDLPS 565 Power and Politics in Organizational Leadership and Decisionmaking (3) Focuses on conceptual frameworks that can be used to analyze power-influence processes in complex organizations and research methods that are well-suited to the study of these processes. Opportunities to design studies of power relations and political processes are provided.

EDLPS 566 Education Policy Serving Disenfranchised Groups (3) This seminar

examines programs and policies aimed at ameliorating conditions that face disenfranchised groups in contemporary K-12 schooling. Seminar members critically analyze the assumptions, design, and likely impact of these programs and policies on institutions and individuals. Designed for advanced doctoral students. Others admitted with permission of instructor.

EDLPS 567 Education Policy and the Improvement of Teaching and Learning (3) Examines connections between policies and classroom practice, in P-12 and higher education settings. Of particular concern is the capacity of policy to improve the quality of curriculum and instruction. Students design and critique policies, drawing on research and feedback from policymakers.

EDLPS 568 Policy Evaluation in Education (3) Examination of methods for evaluating educational policies across the educational continuum. Students design and conduct a policy evaluation which draws on the policy evaluation literature. Examination of the uses of policy evaluation information in shaping organization-decision making is also included.

EDLPS 569 Issues in P-12 School Reform (3, max. 12) *Copland, Knapp* Offers rigorous ways to explore the meaning and action implications of contemporary reform movements in the P-12 public school system. Examines a different topic each quarter concerning reform at school, district, state, or federal levels through readings, discussion, projects, and analytical writing assignments. Offered: AWSpS.

EDLPS 570 Critical Views on Educational Leadership (3) Leadership theory is undergoing a wave of development influenced, in part, by critical theory and postmodern perspectives. Topics include the emerging literature on critical leadership perspectives with a particular goal of understanding how this informs leadership practice for those in educational organizations.

EDLPS 571 Instructional Renewal and the Achievement Gap (3) Examines the meaning of the performance gap between relatively advantaged and disadvantaged students in contemporary American schools and school districts, and the possibilities for reducing and closing it. Especially within classroom instruction. (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 572 Teaching, Learning, and Instructional Renewal in the Context of Learner Differences (2-5, max. 5) Examines the nature of learning and learner differences, and how educators can work productively with these differences, in relation to particular subjects (literacy, mathematics), diversity (language, culture, disability), assessment, and instructional technology. (Only for students admitted to the Leadership for Learning Ed. D. Program.) Credit/no credit only.

EDLPS 573 Title (2-4, max. 4) Text (Only for students admitted to the Leadership for Learning Ed. D. Program.)

EDLPS 579 Special Topics in Organizational and Policy Analysis (1-6, max. 15) Readings, lectures and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to the analysis of educational organizations, policies, and policy making. Topics vary; check Time Schedule for topic(s) to be covered.

EDLPS 580 The American College and University (3) Introduction to contemporary United States higher education, with special emphasis on emerging trends, roles of the several kinds of institutions, the composition and character of student bodies and faculty, and the state coordination of colleges and universities.

EDLPS 581 Principles and Practices of Adult and Continuing Education (3) History and development of adult and continuing education in the United States: component parts of the field; issues, theory, and research; program planning for adults; professionalization of the field.

EDLPS 582 Seminar in the History and the Organization of Higher Education (3) Advanced seminar in the history and the organization of higher education.

EDLPS 583 Higher Education and the Law (3) Legal implications of university operations and an explanation of the legal and constitutional rights of students, faculty, and staff within the university. Special attention given to faculty employment and termination decisions; student protections, including due process; and university liabilities.

EDLPS 584 Academic Governance and Collective Bargaining in Higher Education (3) Explores the concept and operation of collective bargaining in higher education: its origin; the reasons for its growing popularity as a governance mechanism; the legal framework within which it operates; the rights, powers, and duties subsumed under its operation; and its relationship to the traditional form of faculty governance mechanisms.

EDLPS 585 Resource Allocation in Higher Education (3) After attention to the basic tools of economic analysis, focus is on application of those tools to specific topics in higher education (e.g., access, budgeting, finance and policies, and funding alternatives).

EDLPS 587 Seminar in Teaching and Learning in Higher Education (3, max. 9) Theory and practice of instruction and learning in higher education.

EDLPS 588 Seminar in Administration of Community Colleges (3) For students preparing for administrative positions in community colleges. Principles and practices in organization and administration of community colleges.

EDLPS 589 The Community College (3) Intensive study of the community college—its history and present and future status. Curriculum, instruction, financial, and governance issues are also discussed.

EDLPS 590 Student Populations and Experiences in Higher Education (3) Examines foundational literature dealing with students in higher education. Primary focus is on how students change during college, how they make choices and decisions, what roles institutional climate and structure play in the students' experiences, and what impact college has on students.

EDLPS 591 Higher Education and Public Policy (3) Covers public policy processes affecting higher education. Issues examined vary, but typically include fiscal context of higher education policy, access, equity, distance learning, and accountability policies.

EDLPS 598 Special Topics in Higher Education (1-6, max. 15) Readings, lectures,

and discussions pertaining to significant topics of special and current interest to educators. Focus is on issues related to education in community colleges, four-year colleges and universities. Topics vary; check for topic(s) to be covered.

EDLPS 599 Independent Studies in Education (1-10, max. 10) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which with permission of the instructor, must be filed with the Office of Leadership and Policy Studies in the College of Education. Prerequisite: permission of instructor.

EDLPS 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed, and which with permission of the instructor, must be filed with the Office of Leadership and Policy Studies in the College of Education. Credit/no credit only. Prerequisite: permission of instructor.

EDLPS 601 Internship (1-4, max. 12) Name of faculty member responsible for supervising the student should be indicated on program of studies. Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

Educational Psychology

EDPSY 228 Learning and Motivation in Contexts (5) I&S How people learn and remember, what motivates them to learn, and how learning and motivation are shaped by social contexts in homes, school, and communities. Cognitive and socio-cultural theories of learning and motivation (including distributed cognition, goal theories, self-determination theory, and interest theories), especially as related to college learners.

EDPSY 304 Educational Psychology (5) Human learning in the educational setting. Cognition, development, learning, motivation, affective processes, and socialization. Emphasis on skills in influencing classroom learning and discipline. Open to students in the Music Education program or by permission of instructor. Offered: A.

EDPSY 431 Strategies for Classroom Research and Evaluation (5) Techniques and strategies for the design and implementation of studies of classroom instruction. Directed toward classroom teachers as consumers of instructional research and as evaluators in their own classrooms. Credit/no credit only.

EDPSY 447 Principles of Guidance (3) Study of guidance programs in elementary and secondary schools. Attention is given to the roles of specialists with emphasis on the role of the classroom teacher in school guidance programs. This course is designed for teachers, administrators, and prospective teachers.

EDPSY 449 Laboratory in Educational Psychology (2-6, max. 6) Special studies for counselors, teachers, administrators, and others concerned with student personnel and psychological services in schools and colleges. The course focuses on special topics that have either local or contemporary significance.

EDPSY 490 Basic Educational Statistics (3) Measures of central tendency and variability, point and interval estimation, linear correlation, hypothesis testing. Offered: AWSp.

EDPSY 495 Introduction to Educational Measurement (3) Practical understanding of test reliability, validity, and derived scores as they apply to external educational assessments; concepts of criterion and norm-referenced testing; review of group administered norm-referenced and criterion-referenced tests and/or testing programs; test interpretation; issues and ethics in large scale assessment. Prerequisite: EDPSY 490. Offered: W.

EDPSY 499 Undergraduate Research (*) Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program. Offered: AWSp.

EDPSY 500 Field Study (*) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor must be filed in the Office of Educational Psychology in the College of Education. Offered: AWSp.

EDPSY 501 Human Learning and Educational Practice (3) Systematic examination of current research about human learning in educational settings, including the study of behavioral, information processing, social construction, and the developmental perspectives on learning. Offered: AWSp.

EDPSY 502 Developmental Foundations of Early Learning (3) Perceptual-motor, language, and overall cognitive development in children from birth through primary-school age. Emphasis on Piagetian and Vygotskian approaches to development with a special focus on the connections between learning and development. Field-based course projects may be required. Prerequisite: EDPSY 501 or permission. Offered: Sp.

EDPSY 503 Theories of Intelligence (3) Reading and discussion of theoretical and research papers from the extensive literature on Piagetian, psychometric, and information processing conceptions of intelligence. A historical approach to the topic is followed by analysis of current writings on intelligence and its measurement. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology. Offered: alternate years; W.

EDPSY 506 Instructional Theory (3) Sources, current state, and utility of prescriptive instructional theories with emphasis upon theories having a potential for guiding the design of instruction. Prerequisite: EDPSY 501 or equivalent.

EDPSY 507 Reading, Writing, and Arithmetic: Educational Assessment and Consultation (5) Students administer and interpret tests of reading, writing, arithmetic, and related developmental skills; integrate test, observational, interview, and portfolio information in staffings and written reports; and consult with teachers regarding educational interventions. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

EDPSY 508 Clinical Supervision-Practicum (2-6, max. 12) Practicum in supervising counseling, group counseling, diagnostic activities, and remedial academic therapy. Prerequisite: advanced graduate standing. Offered: AWSp.

EDPSY 509 Educational Issues in Human Development (5) Human development theories and models. Educational implications of theory, methodology, and application. Current research complements the historical antecedents of current practice. Age range covered varies as function of current issues in professional literature. Prerequisite: 15 credits in educational psychology or psychology. Offered: alternate years; W.

EDPSY 510 Cognition in the Context of the School Curriculum (3) Contemporary issues and trends in human learning, with a focus on reasoning within subject-matter areas such as mathematics, history, and science. Prerequisite: EDPSY 501 or equivalent. Offered: alternate years.

EDPSY 511 Seminar in Applied Educational Psychology (1, max. 6) Designed for graduate students in educational psychology. Applications of theoretical constructs to particular problems encountered in school counseling, practice.

EDPSY 512 Classroom Assessment Strategies (3) Development and evaluation of traditional, observational, essay, performance-based, portfolio assessments and grading models as they are used in classroom assessment; some review of current research on classroom-based assessment; classroom assessment ethics.

EDPSY 513 Instrument Development (3) Instrument development techniques including construct development, test and item specifications, item writing, planning for reliability and validity studies; ethics in test administration and interpretation. Intended for doctoral or masters students to develop instruments for their own research. Prerequisite: EDPSY 490 or equivalent.

EDPSY 518 Assessment and Diagnosis of Reading Disabilities (3) Techniques for individual assessment of students with reading difficulties (K-12) including formal assessment using standard assessment tools and informal diagnostic teaching. Appropriate for classroom teachers, reading specialists, and school psychologists. Includes conducting and analyzing case studies. Prerequisite: EDC&I 460, EDC&I 462, other reading courses, or permission of instructor. Offered: alternate years; Sp.

EDPSY 519 Communication and Language in Young Exceptional Children (3) Review and discussion of theories of language acquisition as they relate to communication and language in young children. Review of research of language environments that relate to early literacy and education and how to use this information to modify environments for special needs children. Offered: jointly with EDSPE 521; W.

EDPSY 520 Psychology of Reading (3) Reviews current empirical research on cognitive processes in reading, including word and sub-word processes, syntax and comprehension, reading and perception, word recognition, concept development and meaning in reading, psychology of reading interests and skills. Prerequisite: EDPSY 501 or equivalent.

EDPSY 521 Psychology of Writing (3) Examines writing as a cognitive process and reviews current empirical research on writing, emphasizing primarily studies from a psychological perspective. Explores both developmental differences and individual differences in writing

skills, together with instructional implications. Prerequisite: EDPSY 501 or equivalent.

EDPSY 522 Reading Disability Clinic (3-5) Supervised practicum in diagnosis and remediation of reading disabilities. Prerequisite: EDTEP 532, EDTEP 533 or equivalent; EDC&I 460 or permission of instructor.

EDPSY 524 Problem Solving and Critical Thinking in Education (3) Study of the classic and contemporary research literature concerned with human problem solving and critical thinking with emphasis upon applications to educational practice and further research. Prerequisite: EDPSY 501 or equivalent.

EDPSY 525 Creativity and Education (3) Study of the classic and contemporary research literature about creativity with emphasis upon applications to educational practice, evaluation of strategies to promote creativity in the schools, and further research. Prerequisite: EDPSY 501 or equivalent.

EDPSY 526 Seminar on Metacognition (3) Students read and discuss theoretical and research papers from the extensive literature on metacognition. Focuses on defining the concept of metacognition, establishing its range of applicability to educational matters, and becoming familiar with excellent examples of metacognitive research. Prerequisite: graduate status in education or psychology and permission of instructor.

EDPSY 527 Transfer of Teaching (3) Students read and discuss a representative sample of theoretical and research papers from extensive literature on teaching to promote transfer of what students learn to non-teaching environments. Historical approach to the topic is followed by analysis of current writings on transfer. Credit/no credit only. Prerequisite: EDPSY 501 and graduate status in education or psychology.

EDPSY 528 Achievement Motivation in Education (3) Critical review of current research and major theories of achievement motivation in schools and other educational settings. Emphasis on the relationship of theories to the contexts and practice of education. Prerequisite: EDPSY 501 or permission of instructor. Offered: W.

EDPSY 531 Socialization of School-Age Children (3) Study of personal social development and behavior from preschool ages through adolescence. Developmental theory and research are reviewed on the socialization influences of parents and peers and on such topics as aggression, emotional regulation, and social cognition. Prerequisite: EDPSY 501 or equivalent. Offered: W.

EDPSY 532 Adolescence and Youth (3) Developmental processes and patterns examined with major theoretical and current research themes from behavioral sciences as applied to middle school and senior high students. Educational issues, social problems associated with adolescence in Western culture. Prerequisite: EDPSY 501 or equivalent.

EDPSY 533 Current Research in Adolescence (3) Contemporary trends and patterns of adolescent research are examined with emphasis upon theoretical foundations, contrasting methodologies, and implications for further research. Exemplary studies and integrative reviews of research on adolescence

are featured. Prerequisite: EDPSY 532 and EDPSY 591 or equivalents.

EDPSY 534 School Problems of Adolescence (3) Study of the classic, contemporary, and emerging school problems of school age youth with emphasis upon problem solving strategies for educators and associated youth service personnel. Includes problems of academic achievement, interpersonal relations, and social deviancy in the schools. Prerequisite: EDPSY 532 or equivalent.

EDPSY 535 Education and the Highly Capable Learner (3) Examination of major issues and problems in study and nurturance of highly capable children and youth in the educational setting. Emphasis placed on contributions of theory and research to educational problem solving for multiple aspects of advanced human capacity. Prerequisite: EDPSY 501 or equivalent.

EDPSY 536 Learning Variables of Minority Children: Instructional Implications (3) Provides students with data base regarding (1) four variables (language/dialect, cognitive style, locus of control, and motivational systems) that affect learning among minority students, and (2) teaching strategies appropriate for these cultural socioeconomic variables. No credit given for students who have completed EDC&I 425.

EDPSY 540 School Psychological Assessment (5) Study of assessment of human intelligence with supervised training in the administration, scoring, and interpretation of individual intelligence tests with emphasis on Stanford-Binet and Wechsler scales. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: A.

EDPSY 541 Group Tests in Counseling (5) Emphasis on the utilization of objective measures in counseling. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

EDPSY 542 Career Development (3) Emphasis on vocational development theory and research. Psychological, social, and economic determinants of vocational development and choice are examined as a basis for vocational counseling. Prerequisite: graduate standing or permission of instructor.

EDPSY 543 Facilitating Career Development (3) Theory and practice in exploring, self-identified strengths, interests, resources, and other considerations when developing career plans. Emphasizes career development in the schools. Offered: Sp.

EDPSY 544 Counseling (5) Emphasis on the theory and practice of counseling.

EDPSY 545 Prepracticum (3) Competency-based skills training for beginning counseling and school psychology students. Attending, listening, focusing, and intervening behaviors for use with adults and children. Introduction to theories of helping. Prerequisite: enrolled in school counseling or school psychology or permission of instructor. Offered: A.

EDPSY 546 Counseling Practicum (3-5) Supervised practice in counseling. Prerequisite: EDPSY 545 or permission of instructor. Offered: WSp.

EDPSY 548 Educational Implications of Personality Theory (5) Study of personality

development and personality theories with continuous attention to the meaning of these in educational practice, testing, and counseling. Prerequisite: 15 credits of psychology or educational psychology. Offered: A.

EDPSY 549 Seminar in Consultation Methods (3) Theory and practice of process consultation in educational settings. Field practice in teams with clients. Offered: W.

EDPSY 550 Family Counseling (3) Introduction to family counseling theory and practice, emphasizing family dynamics and communication analysis. Prerequisite: permission of instructor. Offered: W.

EDPSY 551 Group and Behavioral Intervention (3) Introduction to competency-based skills for beginning school psychology students. Includes basic processes of group management skills with children including group process in social skills training, problem-solving techniques, behavioral principles, and parent training. Prerequisite: EDPSY 545 or course in counseling techniques or permission of instructor. Offered: Sp.

EDPSY 552 Multicultural Issues in School Counseling and School Psychology (3) Examination of multicultural issues as they relate to the delivery of services provided by school counselors and school psychologists. Theoretical and applied aspects emphasized and case study format utilized. Offered: Sp.

EDPSY 555 Seminar in Counseling Specialty (1-2, max. 6) Oriented toward the role of a counselor as a professional worker. Credit/no credit only. Offered: ASp.

EDPSY 560 Advanced Practicum in Personality Assessment (3) *Jones* Designed for doctoral level school psychologists to learn advanced personality assessment for diagnosis of emotional and behavior disorders. Prerequisite: EDPSY 540; EDPSY 564. Open to Doctoral students only.

EDPSY 561 Group Process Laboratory (3) Explores the theoretical concepts of group process with a special emphasis in how to conduct group process in school and agency settings. Offered: A.

EDPSY 562 Group Counseling in Schools (3) Provides students with the opportunity to co-facilitate groups in elementary, middle, and secondary schools, supplemented by weekly didactic presentations of counseling and guidance models. Prerequisite: EDPSY 561 or permission of instructor. Offered: W.

EDPSY 564 Practicum in School Psychology (1-6, max. 6) Practicum in assessment and consultation, emphasizing diagnosis of behavior and learning disabilities, and focusing on techniques acquired in 507 and 540. Offered: W.

EDPSY 565 Advanced Practicum in Assessment and Cognitive Therapy with High Risk Students with E/BD (3) *Mazza, Stage* Designed for doctoral level school psychologists to learn advanced assessment and cognitive therapy techniques in working with students with EBD under the supervision of a licensed psychologist during a two-quarter sequence. Prerequisite: EDPSY 544, EDPSY 546 or equivalent and enrollment in the Ph.D. school psychology program.

EDPSY 566 Case Study Seminar (1-6, max. 6) Integrating theoretical concepts with practice/service issues. Cases selected for discussion represent a wide range of problems found in schools. Activities include group supervision and peer review. Offered: A/WSp.

EDPSY 568 Seminar in Professional Issues and Ethics (2) Professional ethics codes and cases, history of counseling or school psychology, legal problems, credentialing issues, conditions of practice, continuing education, publishing, and presenting research papers. Credit/no credit only. Offered: W.

EDPSY 569 Seminar in Counseling Psychology Research (2) Methodological and professional issues related to research in counseling and psychological services. Counseling psychology research literature with focus on content and methods. Prerequisite: EDPSY 591 or equivalent.

EDPSY 570 Introduction to School Psychology (2, max. 4) Current issues in professional psychology practice and research. Limited to graduate students in school psychology. Offered: A.

EDPSY 572 Social-Emotional Assessment (3) Techniques in social-emotional assessment of school-aged children. Diagnostic systems including DSM IV presented in conjunction with assessment techniques. Emphasis on integrative method for understanding social emotional assessment batteries and reliability and validity of their test score interpretation. Prerequisite: school psychology or counseling student or permission of instructor. Offered: A.

EDPSY 573 Psychological Assessment of Preschool Children (3) Students learn to give and interpret tests of intellectual development to assess language, play, and social/emotional functioning, and to write psychological assessment reports for infants, toddlers, and preschoolers. Credit/no credit only. Prerequisite: graduate standing in the school psychology specialization and permission of instructor. Offered: Sp.

EDPSY 575 Structural Equation Modeling (3) Theory and data analysis using linear structural equation models. Application to data in educational research. Prerequisite: EDPSY 594 or equivalent. Offered: alternate years.

EDPSY 576 Hierarchical Linear Models (3) Theory and data analysis for research models where random factors are nested, such as multi-level data, growth curve analysis, and meta-analysis. Prerequisite: EDPSY 593 or equivalent. Offered: alternate years.

EDPSY 577 Neuropsychology of School Learning and Behavioral Problems (5) The microstructure, macrostructure, and structural and functional development of the brain are reviewed with a focus on the educational relevance of developmental neuropsychology. Four areas are covered: Hemispheric differences and integration; neurological soft signs, attention deficit, and hyperactivity; language, reading, and learning disabilities; and medical syndromes. Credit/no credit only. Offered: Sp.

EDPSY 578 Educational Applications of Neuropsychology: Assessment and Intervention (5) Students observe and administer neuropsychological tests and plan and carry out educational interventions for children with

neuropsychological disorders. Content focuses on various neuropsychological disorders for which school psychologists can provide assessment and consultation. Prerequisite: EDPSY 540 or equivalent course in individual testing, and EDPSY 577 or permission of the instructor.

EDPSY 580 Seminar: The Emergence of Educational Psychology (3) Examination of documents by selected contributors to the field of educational psychology. Special focus on period from mid-nineteenth century to the later twentieth century. Prerequisite: graduate standing.

EDPSY 581 Seminar in Educational Psychology (1-5, max. 15) Advanced seminar on selected topics in educational psychology. A critical appraisal of current research. Prerequisite: advanced degree work in educational psychology. Offered: A/WSp.

EDPSY 582 Seminar in Development and Socialization (3, max. 15) Advanced seminar on selected topics concerned with human development and socialization processes. Emphasis placed upon empirical research and its theoretical underpinnings in such areas as cognitive development, moral development and education, self-concept development, and related concerns.

EDPSY 583 Seminar in Learning and Thinking (3, max. 15) Seminar in the psychology of learning language and language learning. Each seminar is offered with predesignated emphasis in one of the following topics: linguistics, phonology, pragmatics, psycholinguistics, semantics.

EDPSY 584 Seminar in Quantitative Methods (3, max. 15) Seminar on such topics as measurement techniques, research design, psychometrics, and statistics.

EDPSY 586 Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: second-year doctoral standing and one course in statistics, and permission of instructor. Offered: jointly with EDC&I 578; A.

EDPSY 587 Qualitative Methods of Educational Research (5-) Survey of various qualitative research methods from a variety of disciplinary perspectives (anthropology, sociology, applied linguistics, cognitive psychology, policy analysis, and evaluation) with intensive experience in collection, analysis, and reporting of data. Prerequisite: EDPSY 586/EDC&I 578; second-year doctoral standing and one course in statistics. Offered: jointly with EDC&I 579; Sp.

EDPSY 588 Survey Research Methodology and Theory (3) Survey research, research, theory, and methodology. Probability theory, sampling, human subjects considerations, instrumentation, and analysis techniques. Review and critique by students of theoretical issues in survey research and development of a survey instrument. Prerequisite: EDPSY 490 or equivalent. Offered: A.

EDPSY 589 Scholarly Writing in Education and Psychology (3) Introduction to the demands

and expectations for technical writing in education and psychology, including aspects of the culture of scholarship. Designed for competent writers. Does not address basic grammar and composition. Credit/no credit only. Prerequisite: doctoral standing, and permission of instructor.

EDPSY 590 Computer Utilization in Educational Research (3) Computer utilization in solution of research problems, data reduction to forms amenable to computer solution, appropriate framing of problems for solutions by computer. Using an interactive system, editors, and program packages. Prerequisite: EDPSY 490. Offered: A.

EDPSY 591 Methods of Educational Research (3) Introduction to educational research. Primary focus on hypothesis development, experimental design, use of controls, data analysis and interpretation. Prerequisite: EDPSY 490. Offered: AWSp.

EDPSY 592 Advanced Educational Measurements (3) Theory of measurement; an examination of assumptions involved in test theory, errors of measurement, factors affecting reliability and validity, and item analysis and standards for educational and psychological tests. Prerequisite: EDPSY 490. Offered: Sp.

EDPSY 593 Experimental Design and Analysis (5) Experimental design with emphasis on the analysis of variance. Prerequisite: EDPSY 490 or equivalent. Offered: W.

EDPSY 594 Advanced Correlational Techniques (5) Multivariate analysis, including regression and multiple correlation; matrix algebra; factor analysis. Prerequisite: EDPSY 490 or equivalent. Offered: Sp.

EDPSY 595 Item Response Theory Models of Testing (3) In depth exploration of IRT models and their roles in the development of large scale educational and psychological tests. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 594.

EDPSY 596 Program Evaluation (3) Advanced course in evaluation research emphasizing nontraditional designs, especially those that impose severe ecological constraints on the evaluators. Prerequisite: EDPSY 593, EDPSY 594, EDC&I 597, or permission of instructor.

EDPSY 597 Technical Requirements of Large Scale Tests (3) Theoretical and practical understanding of the quantitative aspects of large-scale tests, including: scaling, norms development, and the development of derived and interpretive scores, evidence for validity and reliability. Prerequisite: EDPSY 490 or equivalent, EDPSY 592, EDPSY 595.

EDPSY 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Offered: AWSp.

EDPSY 600 Independent Study or Research (*) Prerequisite: permission of instructor. Offered: AWSp.

EDPSY 601 Internship (3-10, max. 10) Offered: AWSp.

Special Education

EDSPE 404 Exceptional Children (3) *Edgar* Children with disabilities studied from the point of view of education. Offered: AWS.

EDSPE 414 Introduction to Early Childhood Special Education (3) *Schwartz* Provides students with a comprehensive overview of major aspects of the field of early childhood special education. Theoretical foundations and program development and implementation are presented in an approach that integrates theory, research, and practice. Offered: W.

EDSPE 419 Interventions for Families of Children with Disabilities (3) Upper-division course for professionals and paraprofessionals working with families of children with disabilities. Offered: SpS.

EDSPE 420 Classroom Management of the Physical Problems of Individuals with Severe or Profound Disabilities (3) Overview of physical management of pupils with severe or profound disabilities in educational settings. Principles of normal motor development, positioning, and handling are applied to the development of classroom strategies. Effects of abnormal motor development on educational programming. Offered: Sp.

EDSPE 496 Workshop in Special Education (1-10, max. 15) Demonstration, observation, and/or participation with groups of disabled children in laboratory or controlled classroom settings. Offered: AWSpS.

EDSPE 499 Undergraduate Research (2-5, max. 5) Students developing studies under this rubric should be advised that a report or a paper setting forth the results of their investigations should be regarded as a basic part of the program. Offered: AWSpS.

EDSPE 500 Field Study (1-6, max. 6) Individual study of an educational problem in the field under the direction of a faculty member. Prerequisite: approved plan of study and permission of the instructor. Offered: AWSpS.

EDSPE 502 Collaboration: Working with Parents and Professionals (3) *Sandall* Provides students with knowledge and skills for working collaboratively with other professionals, family members, and paraeducators. Focus is on the role of the special educator in forming and sustaining school, family, and community partnerships. Offered: WS.

EDSPE 504 Special Education and the Law (3) *Brown* Overview of major state and federal laws affecting the operation and management of special education programs in public schools. Emphasis on procedural and substantive rights of children with disabling conditions. Offered: jointly with EDLPS 516; W.

EDSPE 505 Curriculum Development of Students with Moderate to Severe Disabilities (3) Addresses issues and practices in the development of appropriate curricula for students with moderate to severe or profound disabilities. Includes curriculum models, methods for the selection of appropriate skills for inclusion in Individualized Education Plans, and establishing priorities for instruction. Offered: W.

EDSPE 507 Instructional Methods for Students with Moderate to Severe Disabilities (3) *Davis* Details a systematic instructional process for the education of students with moderate to severe or profound disabilities. Includes instructional methods and materials designed to promote the development of skills that are required in school, home, and

community settings, and to reduce challenging behaviors. Offered: Sp.

EDSPE 510 Behavioral Measurement and Management in the Classroom (3) *White* Response measurement in the classroom; use of data analysis for instructional decisions and behavior management for children with disabilities. Offered: A.

EDSPE 511 Methods of Applied Behavior Analysis Research (3) *Schwartz, White* Characteristics of applied behavior analysis are presented: direct, daily measurement, and the systematic investigation of important variables. Representative studies from various applied situations are discussed in terms of dependent and independent variables, research design, reliability, validity, and data analysis. Prerequisite: EDSPE 510 or equivalent preparation. Offered: WSp.

EDSPE 513 Principles of Clinical Appraisal for Teachers of Exceptional Children (3) *Jenkins* Diagnostic instruments used in the clinical appraisal of exceptional children. Theoretical and measurement considerations are used to buttress practical experiences in appraisal related to eligibility and intervention. Offered: A.

EDSPE 514 Fundamentals of Reading for Children with Disabilities (3) *Jenkins* Emphasis on basic prereading and reading skills, such as phonics and structural analysis, specifically for the disabled child. Acquisition of comprehension skills by the disabled. Diagnosis of reading problems, published materials appropriate for children with disabilities, material modification. Offered: W.

EDSPE 515 Problems and Issues in Special Education (3, max. 9) Intensive examination of the issues pertinent to special education, such as legislation, interdisciplinary functions, and the role of special education in general education and placement practices. Offered: Sp.

EDSPE 517 Practicum in Research Design and Analysis in Special Education (1-4, max. 10) Critical analysis of current research in special education and related fields serves as background for designing applied research projects. Projects are examined, evaluated, and revised in seminar discussion. Prerequisite: EDPSY 490 and EDSPE 591 or equivalent and permission of instructor. Offered: AWSpS.

EDSPE 518 Seminar in Special Education Research (1-3, max. 9) Designed for doctoral students in special education during their first year of residency. Each candidate selects a dissertation problem and submits a proposal. Topics such as the procurement of subjects, the reporting and communication of research findings, and the evaluation of research are stressed. The seminar leads to the evolution of a viable dissertation proposal. Credit/no credit only. Offered: AWSp.

EDSPE 520 Seminar in Applied Special Education (1-12, max. 12) Designed for graduate students in special education. Focus on contemporary topics relating to the application of the theoretical constructs to special education. Offered: AWSp.

EDSPE 521 Communication and Language in Young Exceptional Children (3) Review and discussion of theories of language acquisition as they relate to communication and language in young children with special needs. Review of

research of language environments that relate to early literacy and education and how to use this information to modify environments for children with special needs. Offered: jointly with EDPSY 519; W.

EDSPE 522 Seminar on the Education of Students with Severe Disabilities (3) *White* Advanced graduate seminar arranged to study and discuss the essential components of providing a comprehensive approach to the identification and education of infants, children, adolescents, and young adults with severe disabilities. Offered: Sp.

EDSPE 523 Specific Numeracy Techniques for Elementary Students with Mild Disabilities (3) *Neel* Provides the teacher with specific techniques for teaching numeracy to elementary students with mild disabilities in inclusive settings. Prerequisite: EDTEP 522 or equivalent. Offered: SpS.

EDSPE 524 Functional Behavioral Assessment (3) Provides a solid foundation in the theory and practice of functional behavioral assessment (FBA). FBA is a required practice under special education law and considered a best practice for students with challenging behavior. Offered: W.

EDSPE 525 Educating Students with Autism or Severe Behavior Disorders (3) *Schwartz* Consideration of the identification, etiology, education, and outcomes of individuals with autism or other severe behavior-disorders. Offered: Sp.

EDSPE 526 Techniques for Instructing Social Behaviors for Elementary Students with Mild Disabilities (3) *Cheney* Provides prospective and practicing teachers with foundational theory and knowledge to select specific techniques to promote social competency in elementary children with mild disabilities. Discusses research related to use of these techniques and interventions. Develops schoolwide, classroom, and individual plans for teaching social skills. Offered: ASp.

EDSPE 527 Applied Behavior Analysis for Teachers (3) Presents principles of applied behavior analysis as applied to teachers. Focuses on classroom management and individual behavior change including methods for increasing and decreasing behavior, group and individual contingencies, and self-management and rule-based contingencies. Examples in general education/inclusion settings, integrated and self-contained are illustrated.

EDSPE 528 Inquiry and Methods in Writing Instruction (3) Covers methods of assessment and teaching written composition, spelling, and handwriting to children and youth with, and without, disabilities. Particular attention is given to how to establish a strong writing program in elementary classrooms and how to teach writing strategies. Offered: jointly with EDC&I 536; Sp.

EDSPE 541 Education of Children with Behavior Disorders (3) *Neel* Introductory course covering characteristics of and educational practices for children with emotional/behavioral disabilities. Reviews theory, definitional issues, models, assessment, and instructional methods for educating children with emotional and behavioral disorders. Students develop a working knowledge of educational approaches for teaching students with emotional/behavioral disabilities. Offered: alternate years; W.

EDSPE 545 Instructional Modifications for the Education of Children with Mild Disabilities (3) In-depth analysis and application of several modifications of instructional techniques necessary for the education of students with mild disabilities. Offered: WS.

EDSPE 546 Seminar in Educating Children with Behavior Disorders (3, max. 9) *Cheney* Advanced-level seminars focus on contemporary research topics relating to the effective education of children with serious behavior disorders. Students analyze and review research pertinent to the chosen topics and prepare a scholarly manuscript for dissemination. Offered: alternate years; W.

EDSPE 548 Special Topics in the Education of the Learning Disabled (3, max. 12) In-depth analysis of empirical findings in the specialty of learning disabilities with focus on the synthesis of research findings and their application to the educational environment. A paper suitable for publication required. Prerequisite: course in learning theory, introductory course in learning disabilities, or equivalent preparation.

EDSPE 561 Educational Assessment of Young Children with Special Needs (3) Special standardized and educational measurement and evaluation procedures for use with young children with a variety of disabling conditions. Observation, ecological assessment, and programming strategies are discussed in combination with practical application of the skills within an educational framework. Offered: A.

EDSPE 562 Curricula for Preschool Children with Disabilities (3) *Sandall* Basic theoretical models and approaches to curricula for preschoolers with disabilities. Promote specific preschool curricula and develop skills to assist students in critiquing and evaluating curricula. How to adapt materials for specific populations and to plan a program for exceptional preschoolers. Offered: Sp.

EDSPE 563 Issues in Working with Families of Young Children with Special Needs (3) Adjustment of parents to the presence of a young child with disabilities, transactions that occur between parents and their children, procedures that facilitate the child's development through these interactions, and strategies to promote relationships among families and professionals. Offered: W.

EDSPE 565 Seminar: Early Childhood Education for Children with Disabilities (3, max. 9) *Sandall, Schwartz* Advanced seminar on early childhood education for infants and young children with disabilities. Historical and current research from special education and related fields reviewed with regard to their application to the education of young children with disabilities.

EDSPE 566 Current Research in Early Childhood Special Education (2, max. 6) Introduces students to theory and current research related to early intervention with infants and toddlers and how to evaluate research articles. Selected topics cover typical and atypical development in the areas of cognitive, social communication, and social development, as well as issues in assessment, curricula, and intervention strategies.

EDSPE 599 Independent Studies in Education (*) Independent studies or readings of specialized aspects of education. Registration must be accompanied by a study prospectus

endorsed by the appropriate faculty adviser for the work proposed. Offered: AWSpS.

EDSPE 600 Independent Study or Research (*) Registration must be accompanied by a study prospectus endorsed by the appropriate faculty adviser for the work proposed. Offered: AWSpS.

EDSPE 601 Internship (1-10) Prerequisite: graduate standing and permission based on prearrangement of internship placement and approval by adviser. Offered: AWSpS.

Teacher Education Program

EDTEP 501 First Quarter Field Experience — Elementary (2) Field experience and use of reflective process in small group discussions accompanying the first quarter of study in the Elementary Teacher Education Program. Field experience during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 502 Second Quarter Field Experience — Elementary (3) Field experience and use of reflective process in small group discussions accompanying the second quarter of study in the Elementary Teacher Education Program. Field experiences during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 503 Third Quarter Field Experience — Elementary (4) Field experience and use of reflective process in small group discussions accompanying third quarter of study in Elementary Teacher Education Program. Observe school-year opening full-time in late August through September; field experiences during the quarter in supervised school placements. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 505 Portfolio: Tool for Reflection — Elementary (2) Group discussions fostering integration of course work and field experience through reflection. Using program goals and targets, students illustrate their learning through multiple forms of evidence. Final portfolio is presented to an audience. Related field experiences may be arranged. Credit/no credit only. Prerequisite: elementary TEP student.

EDTEP 511 School and Society (3) Exploration of issues regarding schooling and society, such as matters of value and value tension in American schools. Consideration of social values such as equality, opportunity, pluralism, and community; historical and contemporary evidence of values in schooling; and how values can conflict in policy and practice. Prerequisite: elementary TEP student.

EDTEP 521 Teaching and Learning in Numeracy I (3) Focus on mathematics from the perspective of the learner and on the meaning of understanding a mathematics concept. Examination of cultural aspects of the development of these concepts. Prerequisite: elementary TEP student.

EDTEP 522 Teaching and Learning in Numeracy II (3) Focus on pedagogy of mathematics. In conjunction with field experience, students extend understanding of mathematics and successfully integrate mathematics as a tool for learning science and art. Prerequisite: elementary TEP student.

EDTEP 523 Teaching and Learning in Science (3) Science teaching in a manner consistent with how young children learn science concepts and skills. Opportunities are provided for work on science activities similar to those used with elementary school children and to experience many of the problems and successes of preadolescents. Prerequisite: elementary TEP student.

EDTEP 531 Teaching and Learning in Literacy I (3) Investigation of the multiple natures of literacy development. Students study the impact of culture and family on literacy development by reading and discussing a variety of texts while also experiencing the development of their own learning through literature study, the writing process, and oral presentations. Prerequisite: elementary TEP student.

EDTEP 532 Teaching and Learning in Literacy II (3) Introduces participants to the content and process of literacy learning in elementary school. Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

EDTEP 533 Teaching and Learning in Literacy III (3) Introduces participants to the content and process of literacy learning in elementary school. Study of abilities needed for effective literacy use, instructional strategies to help children acquire these abilities, and assessment strategies to evaluate student progress. Prerequisite: elementary TEP student.

EDTEP 541 Dilemmas of Teaching and Learning in Elementary School (4) Covers human learning in the elementary school setting with emphasis on discipline-specific cognition and cognitive development. Prerequisite: elementary TEP student.

EDTEP 542 Meeting the Needs of All Students-Elementary (3) Overview of physical, cognitive, and social development of elementary school age children. Discussion of ways in which differences in development may affect children in school. Provides elementary teachers with understanding of how to facilitate the success of all children in general education classrooms. Prerequisite: elementary TEP student.

EDTEP 543 Teaching and Learning in Social Studies.(3) Introduction to objectives, content, and teaching strategies of social studies and the arts as taught in elementary school.

EDTEP 551 Multicultural Teaching (3) Concepts, theories, and strategies that constitute major dimensions of multicultural education. Focus on racial and ethnic groups, social class, and gender. Dimensions of multicultural education examined include content integration, knowledge construction process, prejudice reduction, equity pedagogy, and empowering school culture and social structure. Prerequisite: TEP student.

EDTEP 552 Assessment in Elementary Education (3) Emphasis on methods of assessment that reinforce understanding of the various disciplines. Includes performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: elementary TEP student.

EDTEP 561 Dilemmas of Teaching and Learning (5) Study of human learning in an

educational setting, with an emphasis on learning of school subjects. Topics include nature of learning, knowledge and teaching, motivation, culture, and cognition. Prerequisite: secondary TEP student.

EDTEP 562 Adolescent Development and Education I (3-) Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

EDTEP 563 Adolescent Development and Education II (-3) Overview of trends and issues of adolescent development and behavior in relation to contemporary secondary schooling. Psychological perspectives on adolescent identity, interpersonal relationships, academic engagement, and social deviancy in schools examined with special attention to classroom management and accommodating differences. Prerequisite: secondary TEP student.

EDTEP 564 Working in Secondary Schools (3) Organizational, personal, and interpersonal aspects of working as a teacher in a secondary school. Preparation for membership and leadership in a learning community and for continuing professional growth. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 565 Planning and Teaching an Integrated Curriculum (3) Introduction of models for integrating curriculum, congruent instructional and assessment strategies, and team planning skills. Provides direct and experiential learning activities and results in production of team-planned curricular units based on two different models of curriculum integration. Prerequisite: secondary TEP student.

EDTEP 571 Topics and Tensions in School and Society (3) Exploration of issues of value and value tension in American schools. Consideration of social values of equality, opportunity, pluralism, and community, historical and contemporary evidence of values in schooling, and how values can conflict in policy and practice. Prerequisite: secondary TEP student.

EDTEP 573 Assessment in Secondary Education (3) Strong emphasis on methods of assessment that reinforce understanding of the various disciplines, including performance assessments, assessments of student projects and papers, traditional exams, and observational exams. Prerequisite: secondary TEP student.

EDTEP 580 Teaching English and Language Arts in Secondary School I (5-) Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 581 Teaching English and Language Arts in Secondary School II (-3) Teaching of English and Language Arts in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 582 Teaching Mathematics in the Secondary School I (5-) Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 583 Teaching Mathematics in the Secondary School II (-3) Teaching of mathematics in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 584 Teaching Social Studies in the Secondary School I (5-) Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

EDTEP 585 Teaching Social Studies in the Secondary School II (-3) Developing, teaching, and evaluating social studies courses on the middle, junior, and senior high school levels. Prerequisite: secondary TEP student.

EDTEP 586 Teaching Science in the Secondary School I (5-) Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 587 Teaching Science in the Secondary School I (-3) Teaching of science in middle, junior, or senior high school. Prerequisite: secondary TEP student.

EDTEP 588 Teaching World Languages I (-) Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills — reading, writing, speaking, listening — and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

EDTEP 589 Teaching World Languages II (-3) Introduction to currently used foreign language teaching methods and approaches, including learning and teaching strategies and techniques for the four skills — reading, writing, speaking, listening — and culture. Current and future trends in pedagogy and technology. Prerequisite: secondary TEP student.

EDTEP 591 First Quarter Field Experience — Secondary (3) Field experience and small group discussions accompanying the first quarter of study in the Secondary Teacher Education Program. Observe school year opening full-time for approximately one month in August and September and two weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 592 Second Quarter Field Experience — Secondary (3) Field experience and small group discussions accompanying the second quarter of study in the Secondary Teacher Education Program. Three weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 593 Third Quarter Field Experience — Secondary (3) Field experience and small group discussions accompanying third quarter of study in Secondary Teacher Education Program. Four weeks full-time during the quarter in supervised school placements. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 595 Portfolio: Tool for Reflection — Secondary (3) Group discussions fostering integration of course work and field experience through reflection. Using program goals and targets, students illustrate their learning through multiple forms of evidence. Final portfolio is presented to an audience. Related field experience may be arranged. Credit/no credit only. Prerequisite: secondary TEP student.

EDTEP 600 Independent Study or Research (1, max. 6) Registration must be accompanied by a study prospectus endorsed by the Director of Teacher Education and the faculty adviser for the work proposed. Credit/no credit only.

EDTEP 601 Fourth Quarter Field Experience (2-10, max. 15) Field experience during the fourth quarter of study in the Teacher Education Program. Full-time student teaching in supervised school placements. Prerequisite: TEP student.

College of Engineering

Aeronautics and Astronautics

AA 101 Air and Space Vehicles (5) NW Introduction to aircraft and spacecraft; how airplanes fly, how airplanes and rockets are made, how they are controlled, and how space missions are designed. Laboratory and computer simulations used as illustrations. Emphasis on conceptual, rather than mathematical, comprehension. Not recommended for upper-division students in physical sciences and engineering. Offered: AWSp.

AA 210 Engineering Statics (4) NW Vector analysis applied to equilibrium of rigid body systems and subsystems. Force and moment resultants, free body diagrams, internal forces, and friction. Analysis of basic structural and machine systems and components. Prerequisite: either MATH 126, MATH 129, or MATH 136; PHYS 121; recommended: graphics background. Offered: AWSp.

AA 280 Introduction to System Engineering (4) Concepts of system approach, system hierarchies, functional analysis, requirements, trade studies, and other concepts used to define and integrate complex engineering systems. Prerequisite: CSE 142. Offered: jointly with IND E 280.

AA 301 Compressible Aerodynamics (4) Aerodynamics as applied to the problems of performance of flight vehicles in the atmosphere. Kinematics and dynamics of flow fields. Thin airfoil theory; finite wing theory. Compressible fluids; one-dimensional compressible flow; two-dimensional supersonic flow. Prerequisite: CHEM E 260. Offered: W.

AA 302 Incompressible Aerodynamics (4) Aerodynamics as applied to the problems of performance of flight vehicles in the atmosphere. Kinematics and dynamics of flow fields; incompressible flow about bodies. Thin airfoil theory; finite wing theory. Prerequisite: PHYS 123; either AMATH 351, MATH 136, or MATH 307. Offered: Sp.

AA 310 Orbital and Space Flight Mechanics (4) Newton's law of gravitation. Two-body problem, central force motion, Kepler's laws. Trajectories and conic sections. Position and velocity as functions of time. Orbit determination and coordinate transformations. Rocket dynamics, orbital maneuvers, Hohmann transfer. Interplanetary trajectories, patched conics. Planetary escape and capture. Gravity assist maneuvers. Prerequisite: M E 230. Offered: A.

AA 311 Atmospheric Flight Mechanics (4) Applied Aerodynamics, aircraft flight "envelope," minimum and maximum speeds, climb and glide performance. Range and endurance, take-off and landing performance, using both jet and propeller power plants. Longitudinal and dynamic stability and control, wing downwash, stabilizer and elevator effectiveness, power effects. Lateral and directional stability and control. Offered: A.

AA 312 Structural Vibrations (4) Vibration theory. Characteristics of single and multidegree-of-freedom linear systems with forced inputs. Approximate methods for determining principal frequencies and mode shapes. Application to simple aeroelastic problems. Prerequisite: M E 230. Offered: W.

AA 320 Aerospace Instrumentation (3) Hands-on laboratory experience in aerospace instrumentation. Students build sensors, power supplies, and circuits. Application of signal conditioning to wind tunnel data. Digital systems, A/D conversion, D/A conversion, and actuator control. Introduction to instrumentation requirements for space vehicles. Offered: A.

AA 321 Aerospace Laboratory I (3) The design and conduct of experimental inquiry in the field of aeronautics and astronautics. Laboratory experiments on supersonic flow, structures, vibrations, material properties, and other topics. Theory, calibration, and use of instruments, measurement techniques, analysis of data, report writing. Offered: W.

AA 322 Aerospace Laboratory II (3) The design and conduct of experimental inquiry in the field of aeronautics and astronautics. Laboratory experiments on subsonic aerodynamics, supersonic flow, structures, propulsion, and other topics. Theory, calibration, and use of instruments, measurement techniques, analysis of data, report writing. Offered: Sp.

AA 331 Aerospace Structures I (4) Analysis and design of aerospace structures. Review of concepts of stress, deformation, strain, and displacement and of the equations of elasticity. Applications to aerospace structural elements, including beams, torsion, plane stress and strain, thin walled structures, plates, buckling; energy principles: introduction to finite element analysis. Fatigue, yielding, and fracture. Prerequisite: CEE 220. Offered: W.

AA 332 Aerospace Structures II (4) Analysis and design of aerospace structures. Review of concepts of stress, deformation, strain, and displacement and of the equations of elasticity. Applications to aerospace structural elements, including beams, torsion, plane stress and strain, thin walled structures, plates, buckling; energy principles: introduction to finite element analysis. Fatigue, yielding, and fracture. Prerequisite: AA 331. Offered: Sp.

AA 360 Propulsion (4) Study of the aero- and thermodynamics of jet and rocket engines. Air-breathing engines as propulsion systems. Turbojets, turbofans, turboprops, ramjets. Aerodynamics of gas-turbine engine components. Rocket vehicle performance. Introduction to space propulsion. Prerequisite: A A 301. Offered: Sp.

AA 400 Gas Dynamics (3) Introduction to kinetic theory and free molecule flow. Review of thermodynamics. One-dimensional gas dynamics: one-dimensional wave motion, combustion waves. Ideal and real gas applica-

tion. Prerequisite: PHYS 123; CHEM E 260. Offered: W.

AA 402 Fluid Mechanics (3) Inviscid equations of motion, incompressible potential flows, small perturbation flows, bodies of revolution, viscous equations, exact solutions, laminar boundary-layer equations, similar solutions, integral methods. Compressibility, instability, turbulent boundary layers. Prerequisite: MATH 324; A A 301. Offered: Sp.

AA 405 Introduction to Aerospace Plasmas (3) Development of introductory electromagnetic theory including Lorentz force and Maxwell's equations. Plasma description. Single particle motions and drifts in magnetic and electric fields. Derivation of plasma fluid model. Introduction to plasma waves. Applications to electric propulsion, magnetic confinement, and plasmas in space and Earth's outer atmosphere. Prerequisite: PHYS 123; MATH 324. Offered: A.

AA 409 Computer Tools for Aerospace III (2) Computer-aided drawing basics, three-dimensional drawing, projections, views. Computer-aided design and analysis tools for stress and heat transfer calculations. Offered: A.

AA 410 Aircraft Design I (4-) Conceptual design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. Offered: W.

AA 411 Aircraft Design II (4-) Preliminary design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. Prerequisite: AA 410. Offered: Sp.

AA 419 Aerospace Heat Transfer (3) Fundamentals of conductive, convective, and radiative heat transfer with emphasis on applications to atmospheric and space flight. Prerequisite: PHYS 123; MATH 307. Offered: W.

AA 420 Spacecraft and Space Systems Design I (4-) Design of space systems and spacecraft for advanced near-Earth and interplanetary missions. Astrodynamics, space environment, space systems engineering. Mission design and analysis, space vehicle propulsion, flight mechanics, atmospheric entry, aerobraking, configuration, structural design, power systems, thermal management, systems integration. Oral presentations and report writing. Design topics vary. Offered: W.

AA 421 Spacecraft and Space System Design II (4-) A continuation of 420. Course content varies from year to year and is dependent on the design topic chosen for 420. Prerequisite: A A 420. Offered: Sp.

AA 430 Finite Element Structural Analysis (3) Introduction to the finite element method and application. One-, two-, and three-dimensional problems including trusses, beams, box beams,

plane stress and plane strain analysis, and heat transfer. Use of finite element software. Prerequisite: CEE 220. Offered: A.

A A 432 Composite Materials for Aerospace Structures (3) Introduction to analysis and design of aerospace structures utilizing filamentary composite materials. Basic elastic properties and constitutive relations of composite laminates. Failure criteria, buckling analysis, durability, and damage tolerance of composite structures. Aerospace structure design philosophy and practices. Prerequisite: A A 332. Offered: W.

A A 441 Flight Test Engineering (3) Determination in flight of performance, stability, and control characteristics of aircraft; and comparison with predicted and wind tunnel results. Prerequisite: A A 311. Offered: Sp.

A A 447 Control in Aerospace Systems (4) Overview of feedback control. Linearization of nonlinear models. Model properties: stability, controllability, observability. Dynamic response: time and frequency domain techniques. Frequency response design techniques. Design of aerospace control systems via case studies. Prerequisite: M E 230; MATH 308. Offered: A.

A A 448 Control Systems Sensors and Actuators (3) Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials, gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratories per week. Prerequisite: either A A 447 or E E 447. Offered: jointly with E E 448.

A A 449 Design of Automatic Control Systems (4) Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, nonminimum phase, nonlinear dynamics. Computer-aided analysis, design, and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either A A 448 or E E 448. Offered: jointly with E E 449.

A A 461 Advanced Propulsion (3) Physical characteristics and components of rockets. Nozzle gasdynamics and non-ideal flow effects. Solid and liquid propulsion systems, components, and design. Aerodynamics of airbreathing engine components: inlets, compressors, turbines, afterburners, nozzles. Engine design methodology. Prerequisite: A A 360. Offered: A.

A A 462 Rocket Propulsion (3) Physical and performance characteristics of rocket propulsion devices. Mission requirements, chemical rockets, arcjets, electrostatic and electromagnetic thruster.

A A 480 Systems Dynamics (3) Equations of motion and solutions for selected dynamic problems; natural frequencies and mode shapes; response of simple systems to applied loads. Prerequisite: A A 312. Offered: Sp.

A A 498 Special Topics in Aeronautics and Astronautics (0-1, max. 10) Lectures and discussions on topics of current interest in aviation and space engineering.

A A 499 Undergraduate Research (1-5, max. 10) Research on special topics under the supervision of a faculty member. Application of

fundamentals learned in the classroom to real problems in research. A maximum of 6 credits may be applied toward senior technical electives. Offered: AWSpS.

A A 501 Physical Gasdynamics I (3) Equilibrium kinetic theory; chemical thermodynamics; thermodynamic properties derived from quantum statistical mechanics; reacting gas mixtures; applications to real gas flows and gas dynamics. Offered: odd years; A.

A A 502 Physical Gasdynamics II (3) Introduction to vibrational relaxation and nonequilibrium chemistry. Nonequilibrium physics applied to flow. Brief introduction to nonequilibrium kinetic theory. Application to a variety of research and development areas such as high-temperature energy systems and gas lasers. Prerequisite: A A 501 or permission of instructor. Offered: even years; W.

A A 503 Kinetic Theory/Radiative Transfer (3) Boltzmann and Collisionless Boltzmann (Vlasov) equations. Instabilities in homogeneous and inhomogeneous plasma, quasi-linear diffusion, wave-particle interaction, collisional (Fokker-Planck) equation. Introduction to radiative nonequilibrium, scattering and absorption processes. Integral equation of radiative transfer. Prerequisite: A A 501 or permission of instructor. Offered: even years; Sp.

A A 504 Fluid Mechanics (3) Review of thermodynamics; vectors and dyads. Derivation of the Navier-Stokes equations, stream functions and potential functions; integrals of the equations of motion. Boundary conditions and discontinuity surfaces in fluids. Exact solutions. Dimensional analysis. Vorticity dynamics. Highly viscous flows. Rotational flows. Offered: A.

A A 505 Fluid Mechanics of Inviscid Flow I (3) Ideal incompressible flow; potential and stream functions. Airfoil theory and lifting line theory. Introduction to nonsteady flow; sound waves and surface waves; special topics. Offered: even years; W.

A A 506 Fluid Mechanics of Inviscid Flow II (3) Ideal compressible flow; supersonic airfoils; shock waves; slender-body theory; lifting surface theory; approximate methods. Transonic flow; similarity; special topics. Prerequisite: A A 505. Offered: even years; Sp.

A A 507 Aerodynamics of Viscous Fluids I (3) Introduction to viscous flow; exact solutions of the laminar equations of motion; approximate equations. Exact solutions for laminar boundary-layer equations. Approximate methods for compressible laminar boundary layers. Offered: odd years; W.

A A 508 Aerodynamics of Viscous Fluids II (3) The phenomena of turbulence; transition prediction; Reynolds stresses; turbulent boundary-layer equations. Approximate methods for turbulent boundary layers. Prerequisite: A A 507 or permission of instructor. Offered: odd years; Sp.

A A 510 Mathematical Foundations of Systems Theory (4) Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of

instructor. Offered: jointly with CHEM E 510/E E 510/M E 510; A.

A A 513 Gas Laser Theory and Practice (3) Physics and fluid mechanics of gas lasers, with emphasis on performance of gas dynamic lasers, flowing chemical lasers, and gaseous electric lasers. Development of laser optics, interaction of radiation and matter, laser oscillation conditions, and methods of obtaining population inversions. Applications of high-power lasers emphasized. Offered: even years; Sp.

A A 516 Stability and Control of Flight Vehicles (3) Static and dynamic stability and control of flight vehicles in the atmosphere. Determination of stability derivatives. Effects of stability derivatives on flight characteristics. Flight dynamic model. Responses to control inputs and external disturbances. Handling qualities. Control system components, sensor characteristics. Stability augmentation systems. Offered: A.

A A 518 Automatic Control of Flight Vehicles (3) Specifications of flight vehicle performance. Synthesis of stability augmentation systems and autopilot control laws in the frequency-domain and using multivariable control methods. Reduced-order controller synthesis, digital design, and implementation. Use of computer-aided control design packages. Prerequisite: A A 516 and A A 548. Offered: odd years; Sp.

A A 520 Seminar (1-, max. 10) Topics of current interest in aerospace engineering. Credit/no credit only. Prerequisite: A A major. Offered: AWSp.

A A 523 Special Topics in Fluid Physics (3) Offered: AWSp.

A A 524 Aircraft Engine Noise (3) Description and measurement of noise, power spectra. Elementary duct acoustics, rotor-stator interaction, effect of design blade loading. Turbine noise, core noise, acoustic linings. Jet noise, Lighthill theory, scaling laws. Offered: odd years; A.

A A 525 Aerothermodynamics of Aircraft Engines Components (3) Estimation of component performances. Inlets and nozzles. Aerodynamics of turbines and compressors. Radial equilibrium theory, through-flow theory. Offered: even years; W.

A A 527 Energy Conversion I (3) Energy resources. Heat generation by combustion, solar collection. Analysis of power systems for space and advanced commercial power generation. High-temperature cycles. Offered: even years; A.

A A 528 Energy Conversion II (3) Heat exchangers, energy storage. Direct conversion of heat to electricity. Electrochemical processes. Recommended: A A 527. Offered: odd years; W.

A A 529 Space Propulsion (3) Nucleonics, and heat transfer of nuclear-heated rockets. Electrothermal, electromagnetic, and electrostatic thrusters. Power/propulsion systems. Prerequisite: permission. Offered: odd years; Sp.

A A 530 Mechanics of Solids (3) General concepts and theory of solid mechanics. Large deformations. Behavior of elastic, viscoelastic, and plastic solids. Linear theory of elasticity and thermoelasticity. Wave propagation in solids. Offered: A.

A A 531 Structural Reliability and Damage (3) Theory of plasticity, yield surfaces, flow rules,

limit theorems. Concepts of failure and fatigue in aerospace structures, residual strength, cumulative damage, probability aspects and case histories. Prerequisite: A A 530 or equivalent or permission of instructor. Offered: odd years; W.

A A 532 Mechanics of Composite Materials (3) Analyses and design of composite materials for aerospace structures. Micromechanics. Anisotropic elasticity. Laminated plate theory. Thermo-viscoelastic behavior and fracture of composites. Prerequisite: A A 530 or permission of instructor. Offered: odd years; Sp.

A A 535 Analysis of Shells I (3) General development of the geometrically non-linear theory of thin elastic shells. Topics include an introduction to tensor analysis with applications to curved two dimensional spaces, theory of surfaces, Kirchhoff approximations, membrane theory and non-linear shallow shells. Offered: even years; Sp.

A A 540 Finite Element Analysis I (3) Formulation of the finite element method using variational and weighted residual methods. Element types and interpolation functions. Application to elasticity problems, thermal conduction, and other problems of engineering and physics. Offered: W.

A A 541 Finite Element Analysis II (3) Advanced concepts of the finite element method. Hybrid and boundary element methods. Nonlinear, eigenvalue, and time-dependent problems. Prerequisite: A A 540 or permission of instructor. Offered: Sp.

A A 543 Computational Fluid Dynamics I (3) Numerical approximation of the inviscid compressible equations of fluid dynamics. Analysis of numerical accuracy, stability, and efficiency. Use of explicit, implicit, and flux split methods. Discussion of splitting, approximate factorization, discrete point, and finite volume approaches. Applications to the solution of simple hyperbolic systems of equations and the Euler equations. Offered: W.

A A 544 Computational Fluid Dynamics II (3) Numerical approximation of equations of compressible viscous flow. Mesh requirements for resolving viscous effects in high Reynolds number flows. Analysis of numerical accuracy, stability, and efficiency. Use of explicit and implicit methods, boundary condition procedures. Applications to solution of the Navier-Stokes equations. Prerequisite: A A 543 or permission of instructor. Offered: odd years; Sp.

A A 546 Advanced Topics in Control System Theory (3) Topics of current interest for advanced graduate students with adequate preparation in linear and nonlinear system theory. Prerequisite: permission of instructor. Offered: when adequate enrollment develops prior to close of advance registration.

A A 547 Linear Systems Theory (4) Linearity, linearization, finite dimensionality, time-varying vs. time-invariant linear systems, interconnection of linear systems, functional/structural descriptions of linear systems, system zeros and invertibility, linear system stability, system norms, state transition, matrix exponentials, controllability and observability, realization theory. Prerequisite: either A A 447, E E 447 or M E 471. Offered: jointly with E E 547/M E 547; A.

A A 548 Linear Multivariable Control (3) Introduction to MIMO systems, successive single

loop design comparison, Lyapunov stability theorem, full state feedback controller design, observer design, LQR problem statement, design, stability analysis, and tracking design. LQG design, separation principle, stability robustness. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with M E 548/E E 548.

A A 549 State Estimation and Kalman Filtering (3) Fundamentals of state estimation for linear and nonlinear systems. Discrete and continuous systems. Probability and stochastic systems theory. Models with noise. Kalman-Bucy filters, extended Kalman filters, recursive estimation. Numerical issues in filter design and implementation. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or A A 548. Offered: jointly with M E 549/E E 549.

A A 550 Nonlinear Optimal Control (3) Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548, E E 548, or M E 548. Offered: jointly with E E 550/M E 550; odd years; A.

A A 553 Vibrations of Aerospace Systems (3) Continuous and discrete systems, natural frequencies, and modal analysis; forced vibrations and motion-dependent forces. Structural damping; control augmented structures. Measurements for structural dynamic testing. Prerequisite: A A 571 or equivalent. Offered: odd years; Sp.

A A 554 Aeroelasticity (3) Static and dynamic aeroelasticity, unsteady aerodynamics, aeroservoelastic modeling, and active control. Offered: even years; Sp.

A A 556 Space and Laboratory Plasma Physics (3) Discussion of waves, equilibrium and stability, diffusion and resistivity, basic plasma kinetic theory, and wave-particle interactions. Prerequisite: either A A 405, ESS 515, or GPHYS 505, or permission of instructor. Offered: jointly with ESS 576; Sp.

A A 557 Physics of Fusion Plasmas (3) Review and comparison of single particle and fluid descriptions of plasmas. MDH equilibrium, flux surfaces, and basic toroidal description. Collisional processes including physical and velocity space diffusion. Introduction to island formation, stochasticity, and various plasma instabilities. Prerequisite: A A 405 or GPHYS 505. Offered: even years; W.

A A 558 Plasma Theory (3) Equilibrium, stability, and confinement. Classical transport, collisionless and resistive skin depths. Ideal MHD equations formally derived and properties of plasmas in the ideal limit are studied. Straight and toroidal equilibrium. Linear stability analysis with examples. Taylor minimum energy principle. Prerequisite: either A A 405, A A 556, A A 557, ESS 576, or GPHYS 537. Offered: even years; Sp.

A A 559 Plasma Science Seminar (1, max. 10) Current topics in plasma science and controlled fusion with presentations by invited speakers, on-campus speakers, and students. Students expected to give a seminar once or twice a year with instructor reviewing the method of presentation and material used for the

presentation. Credit/no credit only. Offered: AWSp.

A A 565 Fusion Reactor Fundamentals (3) Introduction to basic engineering features of fusion power plants. Brief description of basic fusion physics and discussion of power plants for leading thermonuclear concepts. Engineering problems; blanket, shield neutronics; materials, thermal hydraulics; tritium, superconducting systems. Prerequisite: completion of or concurrent enrollment in A A 405 or permission of instructor. Offered: odd years; W.

A A 571 Principles of Dynamics I (3) Systems of particles, rotating axes, rigid-body dynamics; calculus of variations. Lagrangian mechanics. Hamilton's principle. Kane's equations. Periodic and quasiperiodic motion. Stability of dynamical systems. Offered: A.

A A 575 Continuum Mechanics (3) General foundations of the fundamental concepts of motion, stress, energy, and electromagnetism for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Offered: jointly with CEE 508; even years; W.

A A 578 Optimization in System Sciences (3) *Mesbahi* Covers convex sets, separation theorems, theorem of alternatives and their applications, convex analysis, convex functions, conjugation, subgradients, convex optimization, duality and applications, linear and semi-definite programming. Linear matrix inequalities, optimization algorithms, applications in system theory and control, bilinear, rank minimization, optimization software. Recommended: A A 547/M E 547/E E 547. Offered: jointly with E E 578/M E 578; W.

A A 581 Digital Control (3) *Chizeck* Sampled-data systems, and z-transform. Frequency domain properties. Sampling D/A and A/D conversion. Controller design via discrete-time equivalents, direct methods, state feedback and observers. Quantization effects. LQR control and introduction to LQG optimal control. Prerequisite: either E E/A A/ or M E 548. Offered: jointly with E E/M E 581; W.

A A 582 Introduction to Discrete Event Systems (3) *Berg* Modeling DES with automata and Petri nets. Languages. State estimation and diagnostics. Control specifications. Feedback control. Dealing with uncontrollability and unobservability. Dealing with blocking. Timed automata and Petri nets. Prerequisite: A A 447/E E 447/ M E 471. Offered: jointly with E E 582/M E 582; even years; Sp.

A A 583 Nonlinear Control Systems (3) Analysis of nonlinear systems and nonlinear control system design. Phase plane analysis. Lyapunov stability analysis. Describing functions. Feedback linearization. Introduction to variable structure control. Prerequisite: A A/E E 447/M E 471. Offered: jointly with E E/M E 583; odd years; SP.

A A 585 System Identification and Adaptive Control (3) Theory and methods of system identification and adaptive control. Identification of linear-in-parameter systems, using recursive LS and extended LS methods; model order selection. Indirect and direct adaptive control. Controller synthesis, transient and stability properties. Prerequisite: either E E 505 or AMATH 506 or STAT 506; E E 548/A A 548/M E 548. Offered: jointly with M E 585/E E 585.

A A 589 Special Topics in Solid Mechanics (3)
Offered: AWSp.

A A 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with CHEM E/E E/M E 591; AWSp.

A A 593 Feedforward Control (3) *Devasia* Design feedforward controllers for precision output tracking; inversion-based control of non-minimum-phase systems; effect of plant uncertainty on feedforward control; design of feedforward controllers for applications such as vertical take off and landing aircraft, flexible structures and piezo-actuators. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with E E/ M E 593.

A A 594 Robust Control (3) Basic foundations of linear analysis and control theory, model realization and reduction, balanced realization and truncation, stabilization problem, coprime factorizations, Youla parameterization, matrix inequalities, H-infinity and H2 control, KYP lemma, uncertain systems, robust H2, integral quadratic constraints, linear parameter varying synthesis, applications of robust control. Offered: jointly with E E 594/M E 594; odd years; Sp.

A A 599 Special Projects (1-5, max. 15)
Investigation on a special project by the student under the supervision of a faculty member. Offered: AWSpS.

A A 600 Independent Study or Research (*)
Offered: AWSpS.

A A 700 Master's Thesis (*) Offered: AWSpS.

A A 800 Doctoral Dissertation (*) Offered: AWSpS.

Chemical Engineering

CHEM E 260 Thermodynamics (4) NW
Introduction to the basic principles of thermodynamics from a macroscopic point of view. Emphasis on the First and Second Laws and the State Principle, problem solving methodology. Prerequisite: either CHEM 140, CHEM 142, or CHEM 145; either MATH 126, MATH 129, or MATH 136; PHYS 121. Offered: AWSpS.

CHEM E 309 Creativity and Innovation (2)
VLPA Allan Understanding creativity and creative thinking; its challenges and dynamics through knowledge, judgment, planning, and observation. Techniques of creative thinking. Design and development of creative games. Computer-aided creative thinking. Creation, protection, and exploitation of a useful idea, including bargaining and negotiations. Offered: jointly with PSE 309; Sp.

CHEM E 310 Material and Energy Balances (4)
Chemical and physical process calculations: steady- and unsteady-state material and energy balances with specific examples in vapor-liquid contact operations and multiphase extraction, and introductory thermochemistry. Prerequisite: either CHEM E 260 or ENGR 260 with either ENGR 142 or CSE 142. Offered: A.

CHEM E 326 Chemical Engineering Thermodynamics (4) Phase equilibria and chemical

equilibria in multicomponent systems; theories of solution; chemical reaction analysis. Prerequisite: CHEM E 310 with either CHEM E 260 or CHEM 456. Offered: W.

CHEM E 340 Transport Processes II (4) Heat transfer, basic principles, and applications. Conduction, convection, and radiation. Prerequisite: CHEM E 330. Offered: Sp.

CHEM E 341 Energy and Environment (3) NW
Malte Energy use. Fossil energy conversion. Oil, gas, coal resources. Air impacts. Nuclear energy principles, reactors, fuel cycle. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 114, or PHYS 121. Offered: jointly with ENVIR 341/M E 341; A.

CHEM E 442 Renewable Energy (4) NW *Malte* Introduction to renewable energy. Principles and practices: solar, wind, water, and biomass energy conversion. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 115, or PHYS 122. Offered: jointly with M E 442/ENVIR 442; W.

CHEM E 345 Introduction to Fuel Cells (3)
Adler, Schwartz, Stuve Overview of fuel cells, fuel cell efficiency, types of fuel cells, applications of fuel cells, and fuels for fuel cells. Intended for students in science and engineering and fuel cell professionals desiring a technical knowledge of fuel cells. No credit available, if already given for CHEM E 445. Prerequisite: CHEM 162; PHYS 122; recommended CHEM E 260. Offered: A.

CHEM E 355 Biological Frameworks for Engineers (3) For engineers with no prior experience in the biological sciences. Hands-on, project-based course covers fundamental concepts and language of biology, from an engineering perspective. Topics include functions of life, information processing, proteins, DNA, genetic variability, control loops, energetics, tissues, organisms, ecosystems. Prerequisite: CHEM 142; PHYS 123; MATH 307; recommended: CHEM 220. Offered: A.

CHEM E 375 Chemical Engineering Computer Skills (2) *Finlayson* Use Excell, Matlab, and AspenPlus to solve typical chemical engineering problems. Solve realistic problems and explore alternatives that would be inaccessible for hand calculations. Includes equations of state, chemical equilibrium of simultaneous reactions, phase equilibria, plug flow reactors, heat transfer in 1-D, and time-dependent heat transfer. Credit/no credit only. Offered: W.

CHEM E 435 Transport Processes III (4) Mass transfer, basic principles, and applications to equipment design. Physical separation processes. Prerequisite: CHEM E 326; CHEM E 340. Offered: A.

CHEM E 436 Chemical Engineering Laboratory I (3) Lectures on experimental design, instrumentation, laboratory safety, and report writing; laboratory experiments on fluid mechanics and heat transfer. Emphasis on experimental planning, procedures, and report writing. Prerequisite: CHEM E 326; CHEM E 340 which may be taken concurrently; T C 231; recommended: T C 333. Offered: ASp.

CHEM E 437 Chemical Engineering Laboratory II (3) Continuation of 436. Laboratory investigation of chemical engineering principles applied to equipment design with emphasis on mass transfer operations and chemical reactors.

Prerequisite: CHEM E 435; CHEM E 436; CHEM E 465. Offered: W.

CHEM E 445 Fuel Cell Engineering (3)
Introduction to electrochemical fuel cells for use in transportation and stationary power applications. Topics covered include types of fuel cells, single cell operation, stack engineering, overall system design, and safety, with emphasis on proton exchange membrane and solid oxide fuel cells. Prerequisite: CHEM E 330.

CHEM E 446 Fundamentals of Solid Oxide Fuel Cells (3) *Adler* Prepares students with a broad technical knowledge of solid oxide fuel cells, including scientific principles, materials properties and fabrication, design and manufacture, process engineering, economics. Technical focus targeting science and engineering students, or professionals seeking broad technical knowledge. Prerequisite: CHEM 162; PHYS 122; recommended: CHEM E 340. Offered: W.

CHEM E 450 Solid State Materials and Chemical Processes (3) *Seferis* Fundamentals of solid state including process analysis, mechanical properties; heterogeneity; anisotropy; liquid/solid transformations; rate processes; thermal analysis; viscoelasticity; microscopy; molecular characterization techniques. Application of fundamentals in examining polymers, metals and ceramics as used in the electronics and aviation industries. Prerequisite: CHEM E 340; CHEM E 465. Offered: W.

CHEM E 455 Surface and Colloid Science Laboratory (1/3, max. 3) *Berg* Laboratory techniques, equipment, and underlying fundamentals in surface and colloid science. Experiments in the measurement of surface tension, adsorption, wetting and spreading, colloid properties, emulsion preparation and stability, electrophoresis, and interfacial hydrodynamics. Recommended: CHEM E 326; CHEM E 330; CHEM 461. Offered: Sp.

CHEM E 458 Surface Analysis (3) Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 492; W.

CHEM E 461 Electrochemical Engineering (3)
Schwartz Explores role of thermodynamics, charge transfer kinetics, and mass transfer on behavior of electrochemical systems. Includes cell thermodynamics, faradaic and non-faradaic rate processes, ionic transport, nucleation and growth theories. Applications to chemical sensors, batteries, corrosion, thin film deposition. In-class demonstrations to illustrate concepts. Offered: W.

CHEM E 462 Application of Chemical Engineering Principles to Environmental Problems (3) Environmental problems in chemical engineering. Team taught; topics vary from year to year. Includes: geo-media, flow and dispersion through porous media water flow in dry soils, chemistry of radioactive waste, in situ site cleanup, ex situ site cleanup, colloid and surface science. Prerequisite: CHEM E 330. Offered: Sp.

CHEM E 465 Reactor Design (4) Application of principles of chemical kinetics to the design of

commercial-scale chemical reactors; characterization of batch and flow reactors in homogeneous and heterogeneous systems. Prerequisite: CHEM E 326; CHEM E 340. Offered: A.

CHEM E 467 Biochemical Engineering (3) *Baneyx* Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: CHEM E 340; either CHEM 223, CHEM 237, or CHEM 335; recommended: CHEM E 465. Offered: jointly with BIOEN 467; W.

CHEM E 468 Air-Pollution Control Equipment Design (3) Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CEE 494/M E 468; W.

CHEM E 470 Chemistry of Wood (3) Chemical and physical properties of cellulose, lignin, hemicellulose, and extractives; wood as a raw material for the chemical industry. Prerequisite: either CHEM 220, CHEM 238, or CHEM 336. Offered: A.

CHEM E 471 Pulping and Bleaching Processes (3) Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semichemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with PSE 476; W.

CHEM E 472 Papermaking Processes (3) Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with PSE 477; A.

CHEM E 473 Pulp and Paper Laboratory (2) Laboratory experiments in chemical and semichemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with PSE 478; Sp.

CHEM E 480 Process Dynamics and Control (4) Analysis of the dynamics of simple chemical process units and systems; applications to stability, control, and instrumentation of such processes. Weekly two-hour laboratory included. Majors only. Prerequisite: CHEM E 435; CHEM E 465. Offered: W.

CHEM E 481 Process Optimization (3) Concepts and techniques of optimizing chemical engineering processes and systems, including classical and direct methods of search, linear and nonlinear programming, dynamic programming, statistical experimental design, and evolutionary operation. Offered: Sp.

CHEM E 482 Advanced Topics in Process Control (3) *Holt, Ricker* Current topics in process control design and analysis. Possible topics include robustness analysis and design, time delay compensation, modern frequency response techniques, discrete control, adaptive control, model-based control, and nonlinear control. Prerequisite: CHEM E 480.

CHEM E 484 Electronic and Optoelectronic Polymers (3) *Jenekhe* Covers the chemistry, physics, materials science, and engineering applications of semiconducting and metallic conjugated polymers. Examines the structural origins of the diverse electronic and optoelectronic properties of conjugated polymers. Exemplifies applications by light-emitting diodes, lasers, solar cells, thin film transistors, electrochromic devices, biosensors, and batteries. Prerequisite: either CHEM 237, CHEM 455, CHEM E 340, or MSE 310. Offered: A.

CHEM E 485 Process Design I (4) Applied economics in chemical engineering design and operations; market survey and plant location; introduction to plant and process design. Prerequisite: CHEM E 480 which may be taken concurrently. Offered: W.

CHEM E 486 Process Design II (5) Comprehensive design of a specific process, including economic feasibility studies, utilization of market survey and plant location studies, process equipment design and optimization, and overall plant integration and layout. Prerequisite: CHEM E 485. Offered: Sp.

CHEM E 490 Engineering Materials for Biomedical Applications (3) *Hoffman* Combined application of the principles of physical chemistry, biochemistry, materials engineering, mass transfer, and fluid mechanics to biomedical problems. Case studies include considerations of the selection of materials, the design and the operation of instruments, components of, or entire, artificial organs (heart, kidney, lung) and artificial structural elements (bone, teeth, skin), all for use in contact with body fluids. Offered: jointly with BIOEN 490; W.

CHEM E 491 Controlled Release Systems-Principles and Applications (3) *Hoffman* Mechanisms or controlled release of active agents and the development of useful systems for this purpose. Release mechanisms include diffusive, convective, or erosive driving forces. Applications to the biomedical, agricultural, forestry, and oceanography fields. Some special case studies covered in detail. Offered: jointly with BIOEN 491; even years; W.

CHEM E 497 Special Projects in Chemical Engineering Design ([1-6]- max. 12) Chemical engineering design instruction and experience in special projects, such as industrially motivated, timely, or interdisciplinary projects. Project subject and content varies. Majors only. Prerequisite: CHEM E 340.

CHEM E 498 Special Topics in Chemical Engineering (1-4, max. 12) Topics of current interest in the field. Subject matter changes from year to year.

CHEM E 499 Undergraduate Research ([1-6]-, max. 12) Independent research projects in chemical engineering. Offered: AWSpS.

CHEM E 510 Mathematical Foundations of Systems Theory (4) Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 510/E E 510/M E 510; A.

CHEM E 511 Biomaterials Seminar (1) *Hoffman, Horbett, Ratner* Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with BIOEN 511; AWSp.

CHEM E 512 Methods of Engineering Analysis (3) Applications of mathematics to problems in chemical engineering; vector calculus; properties and methods of solution of first and second order partial differential equations; similarity transforms, separation of variables, Laplace and Fourier transforms. Prerequisite: MATH 205, MATH 307 or AMATH 351, MATH 324 or permission of instructor. Offered: jointly with AMATH 512; A.

CHEM E 515 Experimental Methods in Chemical Engineering Research (3) *Baneyx, Berg, Jiang* Lecture and laboratory studies in current research methods of chemical engineering. Includes surface science, biochemical engineering, colloidal chemistry, light scattering, and nanoscience techniques.

CHEM E 523 Seminar in Chemical Engineering (1) Topics of current interest in chemical engineering. Credit/no credit only. Offered: AWSp.

CHEM E 525 Chemical Engineering Thermodynamics (4) Review of principles of thermodynamics. Applications to problems in multiphase and multicomponent systems; theories of solutions. Prerequisite: undergraduate thermodynamics. Offered: A.

CHEM E 526 Topics in Thermodynamics (3) Classical and molecular thermodynamics of phase equilibria, solution theory, thermodynamic stability, and critical phenomena. Prerequisite: CHEM E 525 or permission of instructor.

CHEM E 530 Momentum, Heat, and Mass Transfer I (4) Derivation of the differential equations for mass, energy, and momentum transport. Principles of fluid mechanics; creeping flow, turbulence, boundary-layer theory. Offered: A.

CHEM E 531 Momentum, Heat, and Mass Transfer II (3) Continuation of 530. Flows of fluid-particle systems; convective heat transfer, natural convection. Prerequisite: CHEM E 530. Offered: W.

CHEM E 554 Nanoscale Science I: Contact Mechanics and Rheology on the Nanoscale (3) *Overney* Introductory nanoscale science with emphasis on contact mechanics, principle and concept of forces, scanning force microscopy, tribology (friction, wear, lubrication), rheology, ultrathin organic films, physical properties of polymers, and computer simulation.

CHEM E 555 Interfacial Phenomena (4) *Berg* Surface tension, capillary statics, wetting and spreading phenomena; thermodynamics of capillary systems, adsorption, surfactant monolayers and micellar solutions; capillary hydrodynamics, interfacial turbulence and applications in distillation, absorption, and extraction. Prerequisite: CHEM E 525, CHEM E 530, or permission of instructor. Offered: even years.

CHEM E 556 Principles and Applications of Colloidal Materials (3/4) *Berg, Hoffman* Preparation, stabilization, properties, and destruction of important colloidal materials. The theory and structure of the electrical double layer,

electrokinetics. Includes selected case studies pertinent to air and water pollution, biological fluids, industrial processes. Offered: odd years.

CHEM E 557 Research in Interfacial and Colloid Science (1) *Berg* Weekly research seminar and discussion of scientific literature pertaining to interfacial and colloid science. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSp.

CHEM E 558 Surface Analysis (3) *Ratner* Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with BIOEN 592; W.

CHEM E 559 Thin Film Science, Engineering, and Technology (3) *Stuve* The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with MSE 559.

CHEM E 560 Reactions at Solid Surfaces (3) *Stuve* Fundamental studies of adsorption systems and reactions that occur at surfaces with application toward heterogeneous catalysis, electrochemistry, etching, and corrosion. Analysis of reaction poisons and promoters, acid-base theory of metal surfaces, jellium theory of metals, and water and ion adsorption, plus other topics of current interest. Recommended: CHEM E 558 or CHEM 560.

CHEM E 561 Electrons at Surfaces (3) *Stuve* Properties of electrons at solid surfaces and their role in surface chemical reactions pertaining to electrochemistry, corrosion/etching, and catalysis. Topics include the jellium model of surfaces, surface electronic structure, work function, surface electric fields, reactions involving electrons, ions, and net charge transfer, and relationships between catalysis and electrochemistry.

CHEM E 562 Hazardous Air Pollution (3) Control of emission of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and adsorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CEE 556; W.

CHEM E 564 Applications of Chemical Kinetics (3) Fast reactions and highly energetic reactions with applications to combustion, explosions, and lasers. Coupling of transport processes and reaction rates, photochemical kinetics, intermolecular energy transfer, free radical, and chain reaction kinetics. Rate plasmas, flames, and biological systems.

CHEM E 565 Kinetics and Catalysis (3) *Finlayson, Krieger, Stuve* Homogeneous and heterogeneous systems with emphasis on chemical engineering principles applied to industrial reactor design. Prerequisite: CHEM E 525. Offered: W.

CHEM E 566 Control of Gaseous Air Pollutants (3) *Pilat* Physical and chemical processes used to control gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CHEM E 435 or CHEM E 468 or permission of instructor. Offered: jointly with CEE 558; even years; Sp.

CHEM E 567 Control of Particulate Air Pollutants (3) *Pilat* Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CHEM E 468 or permission of instructor. Offered: jointly with CEE 559; odd years; A.

CHEM E 570 Chemistry of High Polymers (3, max. 6) *Allan* Fundamentals of high polymer chemistry, including kinetics of addition and condensation polymerization, the determination of average molecular weights and chain length distributions, solution properties and the relationship between molecular structure and plastic film and fiber properties of various polymers. Prerequisite: an undergraduate sequence in organic chemistry. Offered: W.

CHEM E 571 Polymer Physics and Engineering (3) *Seferis* Description and analysis of methods for processing polymeric materials. Introduction to solid polymer physics with emphasis on the coupling of structure morphology and properties. Development of structure-property models for quantitative description and control of properties in synthetic and natural polymers and composite materials. Offered: A.

CHEM E 572 Advanced Polymeric Composites (3) *Seferis* Design, manufacture, and properties of organic and inorganic particle and fiber-reinforced polymers. Advanced techniques for characterization of processing and properties, including anisotropic elasticity/viscoelasticity theory, polymerization and network formation of matrices, theory of reinforcement, environmental and chemical effects. Prerequisite: CHEM E 571 or MSE 423 or permission of instructor. Offered: Sp.

CHEM E 575 Nonlinear Analysis in Chemical Engineering (3) *Finlayson* Comparison of numerical techniques: similarity, perturbation, finite difference, Galerkin, orthogonal collocation methods as applied to nonlinear chemical engineering problems.

CHEM E 580 Topics in Chemical Engineering Design (3, max. 9) Lectures and seminars on current design methods in chemical engineering, including technical and economic feasibility of processes, design and optimization of process equipment, and environmental and social constraints. Prerequisite: undergraduate chemical engineering design, admission to chemical engineering non-thesis master's program, or permission of instructor.

CHEM E 582 Advanced Topics in Process Control (3) *Holt, Ricker* Current topics in process control design and analysis. Possible topics include robustness analysis and design, time delay compensation, modern frequency response techniques, discrete control, adaptive control, model-based control, and nonlinear control. Prerequisite: undergraduate control class and graduate standing.

CHEM E 584 Electronic and Optoelectronic Polymers (3) *Jenekhe* Covers the chemistry, physics, materials science, and engineering applications of semiconducting and metallic conjugated polymers. Examines the structural origins of the diverse electronic and optoelectronic properties of conjugated polymers. Exemplifies applications by light-emitting diodes, lasers, solar cells, thin film transistors, electrochromic devices, biosensors, and batteries. Prerequisite: either CHEM 237, CHEM 455, CHEM E 340, or MSE 310. Offered: A.

CHEM E 588 Research in Applied Microbiology (1) *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with MICROM 588; A/WSpS.

CHEM E 590 Advanced Topics in Biomaterials (3) Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: CHEM E 490 or BIOEN 490. Offered: jointly with BIOEN 590; odd years; Sp.

CHEM E 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A/A/E E/M E 591; A/WSp.

CHEM E 598 Effective Teaching of Chemical Engineering ([1/2]-, max. 3) *Finlayson* Topics/activities include: curriculum development: outlining a course, comparing textbooks, preparing lectures, use of lectures versus quiz sections, microteaching, other modes of instruction, e.g., self-paced, use of design problems. Tests: creating and grading. Role of computers, review of engineering software, diversity, international teaching assistants, sexual harassment, assessment of teaching, resume. Offered: WSp.

CHEM E 599 Current Topics in Chemical Engineering (1-3, max. 12) Readings or lectures and discussions of topics of current interest in the field of chemical engineering. Subject matter changes from year to year. Prerequisite: permission of instructor.

CHEM E 600 Independent Study or Research (*) Offered: A/WSpS.

CHEM E 700 Master's Thesis (*) Offered: A/WSpS.

CHEM E 800 Doctoral Dissertation (*) Offered: A/WSpS.

Civil and Environmental Engineering

CEE 220 Introduction to Mechanics of Materials (4) NW Introduction to the concepts of stress, deformation, and strain in solid materials. Development of basic relationships between loads, stresses, and deflections of structural and machine elements such as rods, shafts, and beams. Load-carrying capacity of these elements under tension, compression, torsion, bending,

and shear forces. Prerequisite: AA 210. Offered: AWSpS.

CEE 306 Construction Engineering I (3)

Introduction to construction engineering, planning, methods, contracts, and specifications. Scheduling manually and by using computer software. Production estimates; equipment selection; ownership and operating costs; role of the engineer in construction and cost estimating.

CEE 316 Surveying Engineering (4) Measurement and mapping techniques. Computer adjustment of measurements, analysis of error. Horizontal and vertical control. Global and plane coordinate systems, transformation. Horizontal and vertical curve computations, layout. Earthwork and volume measurements, computations. Leveling and datum considerations. Introduction to photogrammetry, GPS, GIS, remote sensing, cadastral surveys, and construction surveys. Recommended: statistics. Offered: A.

CEE 320 Transportation Engineering I (3)

Study of vehicular transportation fundamentals including geometric design, pavement design, traffic flow concepts, level of service analysis, intelligent transportation systems, travel demand prediction methods, and management of transportation systems. Includes a review of relevant vehicle operating characteristics.

CEE 342 Fluid Mechanics (4) Elementary mechanics of incompressible fluids. Hydrostatics. Continuity, energy, and momentum equations. Introduction to potential flow. Resistance phenomena for laminar and turbulent flows. Dynamic similitude. Offered: A.

CEE 345 Hydraulic Engineering (4) Extension and application of fluid mechanics principles to hydraulic engineering problems. Open channel flow, pipeline systems, turbomachinery, unsteady flow in pipes, diffusion and mixing processes, groundwater, surface water hydrology. Prerequisite: CEE 342. Offered: W.

CEE 350 Environmental Engineering — Water and Air Quality (4) Description of water and air resources and parameters that characterize their quality, how their use alters their properties. Mass and energy balances as they apply to environmental systems. Global environment change. Basics of aquatic chemistry and microbiology applied to municipal water and wastewater treatment operations. Offered: Sp.

CEE 363 Constructional Materials (4) General treatment of physical and mechanical properties and engineering behavior of metallic and nonmetallic materials. Steel, aluminum, asphalt concrete, Portland cement concrete, wood. Laboratory testing, instrumentation, and investigation into macrobehavior. Correlation with microstructure and various aspects of materials science.

CEE 366 Basic Soil Mechanics (4) Introduction to basic soil properties, soil classification, volumetric relationships, compaction, consolidation, soil rheology, shear strength, bearing capacity, and lateral stresses against retaining structures. Prerequisite: CEE 220. Offered: Sp.

CEE 379 Elementary Structures I (4) *Eberhard, Miller, Turkiyyah* Fundamental analysis and modeling of civil structural systems (trusses, beams, and frames), including design applications. Linear equilibrium, kinematics, and

constitutive relations; formal solution procedures emphasizing element-based stiffness methods; computer-based and manual techniques; verification and interpretation of results; case studies involving local structures.

CEE 380 Elementary Structures II (4) *MacRae, Roeder, Stanton* Structural design concepts, approaches, procedures, and codes. Characterization and determination of loads (dead, live, seismic, wind, etc.) Structural systems and system behavior (load paths, lateral and vertical response, failure modes and limit states). Structural component behavior and design (composite action, inelastic bending, column stability, member capacities). Prerequisite: CEE 379. Offered: Sp.

CEE 390 Civil Engineering Systems (3)

Introduction to civil engineering system processes. Decision methods, economic considerations, and optimization. Examples illustrating quantitative and subjective aspects of civil engineering practice. Offered: A.

CEE 391 Graphics Communication and Computer-Aided Design (3)

Introduction to graphics communication and computer-aided design tools to manipulate drawings, data, and geometric representations in civil engineering applications.

CEE 392 Basic Civil Engineering Computing (1)

Introduction to computer-based methods in civil and environmental engineering problems using Matlab.

CEE 404 Infrastructure Construction (4)

Muench Basic concepts of large infrastructure construction projects including planning, scheduling, life-cycle cost analysis (LLCA), construction cost, logistics, productivity and, where applicable, traffic impacts. Uses currents and prototype industry software and involves direct contact with agency and contractor personnel involved in infrastructure projects. Prerequisite: CEE 306. Offered: Sp.

CEE 405 Construction Planning and Scheduling (3)

Principles of construction planning and scheduling, including network analysis of construction activities, examination of arrow and precedence diagrams, time-cost tradeoffs, resource leveling, resource allocation, PERT, integrated cost/schedule systems, computer applications, and a CPM project.

CEE 406 Construction Engineering II (3)

Heavy construction equipment. Equipment economics, contractor equipment policies, equipment specifications, selection and performance of equipment, estimating productivity of construction equipment, and engineering support for construction operating. Prerequisite: CEE 306.

CEE 407 Contracts and Specifications (3)

Construction industry, forms of organizations, real property laws, and bidding procedures. Basic elements of contracts, types of specifications, general conditions of standard construction contracts, legal disputes related to construction contract provisions, surety bonds and construction insurance. Prerequisite: CEE 306.

CEE 410 Traffic Engineering Fundamentals (3)

General review of the fundamentals of traffic engineering, including their relationship to transportation operations management and planning, with emphasis on calculations and procedures in the *Highway Capacity Manual*;

field surveys and data analysis. Prerequisite: CEE 320.

CEE 412 Transportation Data Management (3)

Wang Introduction to modern concepts, theories, and tools for transportation data management and analysis. Applications of software tools for transportation data storage, information retrieval, knowledge discovery, data exchange, on-line information sharing, statistical analysis, system optimization, and decision support.

CEE 416 Urban Transportation Planning and Design (3)

Brief review of major issues in urban transportation planning. Planning process discussed and transportation models introduced. Uses a systems framework, including goals and objectives, evaluation, implementation, and monitoring. A design term project, individual or small groups, utilizes material presented on a contemporary problem. Prerequisite: CEE 320. Offered: A.

CEE 418 Computer-Aided Planning of Urban Systems (3)

Survey of on-line planning applications; use of various on-line systems to solve urban systems design problems; investigations of hardware/software tradeoffs; human factors in man-computer systems design theory as it relates to problem-solving activity. Offered: jointly with URBDP 429.

CEE 421 Pavement Design (3)

Current and developing procedures for the structural thickness design of pavements. Bituminous and concrete pavements for highways, airports, and special heavy loading. Elastic layered systems, slab theory. Performance evaluation for maintenance and overlay design. Offered: ASP.

CEE 422 Construction Materials II (4) Types, sources, uses, performance behavior from construction point of view of aggregates; asphalt products and mixtures; Portland cement, concrete, and other materials the civil engineer is responsible for selecting and manufacturing on job site. Includes laboratory work. Prerequisite: CEE 363. Offered: A.

CEE 423 Heritage of Civil Engineering (3/4)

I&S Contribution of civil engineering to civilization based on the lives and projects of prominent engineers and cultures. Incidents and individuals from prehistory to the nineteenth century give the student an awareness of the profession and its influence on society. Industrial archaeology and historic sites are considered. An additional 1 credit may be earned by participating in a special project. Emphasis on the control of elements and the methodology, planning, objectives, and reasons for the project. May be used as social science distribution. Offered: W.

CEE 424 GIS for Civil Engineers (3)

GIS in civil engineering applications. Geographic and spatial data types and acquiring considerations. Data models and structures. Projections and transformations. Attribute-based operation, spatial operations. Surfaces and near neighbors. Training on Arc GIS software. Recommended: CEE 316.

CEE 425 Reinforced Concrete Construction (3)

Janssen Processes in constructing reinforced concrete structures. Identification and development of solutions to potential constructability problems. Lectures augmented with industry speakers and a field trip to a building under construction. Requires senior or graduate standing in Civil Engineering or Construction Management and familiarity with reinforced concrete design/construction.

CEE 428 Lightweight Cementitious Composites (2) *Janssen* Introduction to the process of designing within constraints and introductory experimental design. Importance of proper laboratory documentation. Examines the characteristics of cementitious binders and elementary composite behavior. Considers constructability. Interprets pre- and post-cracking elastic behavior. Organization and production of technical report the documents work performed. Offered: A.

CEE 431 Seismology and Earthquake Engineering (3) *NW* Presents an overview of earthquake processes and details of the characteristics of destructive ground motion; illustrates the effects of such motion on engineering structures; reviews current practice in estimating earthquake hazards for important structures such as nuclear power plants. Prerequisite: either MATH 136 or both MATH 307 and MATH 308. Offered: jointly with ESS 465.

CEE 436 Foundation Design (3) Design considerations for foundations and retaining structures. Subsurface investigations and determination of soil properties for design. Design of shallow and deep foundations and retaining structures. Foundations and soil considerations for waterfront structures.

CEE 437 Engineering Geology I (3) General overview of engineering geology and its importance to civil engineers. Topics include geologic processes, hazards, oring and classification of geologic materials, data synthesis, and natural construction materials.

CEE 440 Professional Practice Studio (2) Fundamentals of integrated civil engineering design, professional services marketing, project management, team dynamics, total quality management, value engineering, professional liability, and applied ethics in engineering practice. Emphasis on written and oral communications and on ethical, social, and economic factors.

CEE 441 Transportation and Construction Capstone (4) Comprehensive design project focusing on planning, design and construction of transportation project such as highways, transit, and airports. Prerequisite: CEE 320; CEE 440, which may be taken concurrently.

CEE 442 Structural Geotechnical Design Project (4) Comprehensive team design project focusing on structural and geotechnical engineering. Requires design drawings, written reports, and oral presentations interfacing with related fields such as aesthetics and architecture, mechanical systems, traffic, environmental planning. Prerequisite: CEE 440; two courses from CEE 436, CEE 451, CEE 452, CEE 453, CEE 454, or CEE 457.

CEE 443 Design of Subsurface Remediation Activities (4) Technologies for cleaning sites with subsurface contamination, including groundwater extraction, vapor extraction, groundwater containment, and in-situ treatment. Analytical tools and methods for making design calculations are emphasized. Comprehensive design project involving design and evaluation of site remediation activities required. Prerequisite: CEE 440.

CEE 444 Water Resources and Hydraulic Engineering Design (4) Opportunity to effect design solutions for projects or major project components in such representative areas as

reservoirs and associated systems for flood control, water supply, irrigation, and hydroelectric power, surface water control systems, fisheries related projects, small harbors, and coastal engineering problems. Prerequisite: CEE 440.

CEE 445 Environmental Engineering Design Project (4) Individual and group design studies addressing environmental engineering problems such as stormwater management, water and wastewater treatment facilities, and residual processing. Prepare proposals, engineering reports, and alternative evaluations; process equipment design, present reports on selected design problems. Prerequisite: CEE 345; either CEE 482 or CEE 483; CEE 440.

CEE 451 Design of Metal Structures (3) Introduction to the design and behavior of metal structures using LRFD concepts. Application of design methods and codes to columns, beams, frames, connections, and tension members. Prerequisite: CEE 380; recommended: CEE 457, CEE 458.

CEE 452 Design of Reinforced Concrete Structures (3) Fundamentals of design of buildings in reinforced concrete in accordance with current codes and practices. Prerequisite: CEE 380.

CEE 453 Prestressed Concrete Design (3) Analysis, design, and construction of prestressed concrete structures.

CEE 454 Design of Timber Structures (3) The design and construction of timber structures, using elements made of sawn wood, glued-laminated wood, and plywood. Prerequisite: CEE 380.

CEE 455 Structural Unit Masonry (3) Structural behavior and design of reinforced brick, tile, and unit concrete masonry structures. Prerequisite: CEE 380. Offered: jointly with ARCH 426.

CEE 457 Advanced Structures I (3) The displacement method in matrix form with programming applications. Fundamentals of modeling of various types of structures. Prerequisite: CEE 380.

CEE 458 Advanced Structures II (3) Introduction to stability, including a consideration of elastic and inelastic buckling with applications to beam-columns and plates. Introduction to plastic analysis. Prerequisite: CEE 379.

CEE 459 Advanced Structural Mechanics (3) Formulation and solution of the basic equations of elasticity. Applications in 2-D stress analysis, torsion, thermal stresses, and beams on elastic foundation. Plate theory optional. Prerequisite: CEE 379.

CEE 461 Biological Problems in Water Pollution (3/5) *NW* Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities. Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with FISH 430.

CEE 462 Applied Limnology and Pollutant Effects on Freshwater (3/5) *NW* Principles of aquatic ecology that relate to causes and effects of water quality problems in lakes and streams. Population growth kinetics, nutrient cycling,

eutrophication; acidification, oxygen/temperature requirements, and effects of various wastes on aquatic animals.

CEE 464 Subsurface Contaminant Transport (3) Principles of transport through porous media used to study fate and movement of subsurface contamination. Processes include aqueous phase transport, flow of immiscible fluids, vapor transport, solid-liquid-vapor interactions. Techniques for simulating transport processes presented. Effects of subsurface heterogeneities and uncertainties are emphasized. Prerequisite: CEE 342.

CEE 472 Introduction to Hydraulics in Water Resources (3) Hydraulics related to environmental issues. Global hydrology; stratified flows; two-phase (bubble) flows; pollutant transport and mixing in reservoirs, lakes, coastal waters, and oceans; diffuser design and related case studies. Prerequisite: CEE 342; CEE 345.

CEE 473 Coastal Engineering I (3) Linear theory of water waves, wave transformations due to boundary conditions, sediment motion, elementary tidal theory; applications illustrated by laboratory experiments and selected case histories. Prerequisite: CEE 342.

CEE 474 Hydraulics of Sediment Transport (3) Introduction to sediment transport in steady flows with emphasis on physical principles governing the motion of sediment particles. Topics include sediment characteristics, initiation of particle motion, particle suspension, bedforms, streambed roughness analysis, sediment discharge formulae, and modeling of scour and deposition in rivers and channels. Prerequisite: CEE 345.

CEE 475 Analysis Techniques for Groundwater Flow (3) Development of appropriate equations to describe saturated groundwater flow, and application of numerical methods for solving groundwater flow problems and flow to wells. Participants required to solve specific problems using numerical techniques developed during the course. Prerequisite: CEE 342.

CEE 476 Physical Hydrology (3) Global water picture, data sources and data homogeneity, precipitation, evapotranspiration, hydrographs. Hydrologic data frequency analysis. Hydrologic design: flood mitigation, drainage. Introduction to deterministic and stochastic models.

CEE 477 Open-Channel Engineering (3) Water flow in natural and constructed channels. Analysis and design of canals, transitions, energy dissipators, and similar structures. Analysis of surface profiles and effect of nonlinear alignment on flow. Introduction to river mechanics. Design-oriented problems. Prerequisite: CEE 345.

CEE 480 Air-Quality Modeling (3) Evaluation of air-quality models relating air pollution emissions to environmental concentrations. Topics include meteorological dispersion models and various "receptor" models based on chemical "fingerprinting" of sources. Emphasizes current problems. Offered: jointly with ATM S 480.

CEE 481 Hydraulic Design for Environmental Engineering (3) *Stensel* Introduction to the theory and the practice of planning and design of urban water supply distribution, pump stations, and sewage and storm-water collection systems. Evaluation of service areas and service requirements and their relationships to urban and

regional planning activities. Engineering methods and computer programs for designing basic system elements. Prerequisite: CEE 345; CEE 350.

CEE 482 Wastewater Treatment and Reuse (3) Introduction to wastewater treatment and systems, emphasizing fundamental biological, chemical and physical processes related to protection of public health and water pollution control. Process analysis of the configuration of sizing of major types of treatment processes for various sizes of plants and effluent requirements. Prerequisite: CEE 350.

CEE 483 Drinking Water Treatment (3) Scientific and engineering principles underlying drinking water treatment; analysis of key contaminants; development of conceptual models for how and why treatment processes work and mathematical models describing their performance under various design and operating scenarios; field trips to water treatment systems. Prerequisite: CEE 350.

CEE 484 On-Site Wastewater Disposal (3) Latest information on design, construction, operation, maintenance of individual and small community wastewater disposal systems. Conventional water carriage septic tank soil absorption systems considered with new alternatives, such as mounds, evapotranspiration systems, anaerobic filters, pressure drainfields, sand filters. Nonwater carriage methods studied. Pressure and vacuum sewers introduced.

CEE 485 Environmental Engineering Chemistry (3) *Benjamin, Korshin* Fundamentals of chemical equilibrium in natural water systems. Behavior of open and closed aqueous and multi-media (air/water/solids) systems. Chemistry of major species affecting the environment. Identification of key parameters for characterizing water quality and of chemical processes. Recommended: one year of general chemistry or equivalent.

CEE 486 Environmental Analysis Laboratory (3) Introduction to water quality parameters; theory of instrumentation and methods used for the environmental analysis. Laboratory analysis of environmental samples using a variety of techniques including titrations, chromatography, and absorption and emission spectrophotometry. Recommended: one year of general chemistry.

CEE 487 Solid-Waste Disposal (3) Describes sources and handling of municipal and industrial solid waste, with examination of collection, processing, recycling and resource recovery, and disposal alternatives. Public policy issues, local agencies and solid waste facilities, the legal and regulatory framework are all addressed in context of solid waste engineering.

CEE 488 Hazardous Wastes Engineering (3) Classification of hazardous wastes; resource conservation, Recovery Act regulations; characteristics and behavior of toxic organics; superfund; groundwater contamination, solutions. Hazardous waste site remedial action; case histories; sampling; landfill design. Stabilization and processing technologies, including incineration, carbon adsorption, emerging techniques. Prerequisite: CEE 351.

CEE 489 Water and Air Quality Sampling (2) Samples collected from lakes, streams, precipitation, and air and resulting (and supplemental) data interpreted for cause-effect and statistical inference. Design for water and air

quality monitoring programs. Prerequisite: CEE 462.

CEE 490 Air-Pollution Control (4) Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with ENV H 461.

CEE 491 Deterministic Systems (3) Development of quantitative methods for mathematical problem solving with emphasis on computer applications. Linear programming, mathematics of the simplex algorithm, sensitivity analysis, dynamic programming, systems simulation, and goal programming. Class project required. Prerequisite: CEE 390.

CEE 492 Stochastic Systems (3) Introduction to probability distributions and statistics useful in systems analysis, conditional distributions, queuing theory and applications, Monte Carlo simulation, chance-constrained mathematical programming, and stochastic dynamic programming. Emphasis on application of the techniques to civil engineering systems problems, including transportation, water resources, and structures. Prerequisite: CEE 491.

CEE 493 Air-Pollution Source Testing and Equipment Evaluation (3) Engineering evaluation of air pollutant sources and air control equipment. Air-pollutant source testing and stack sampling. Analysis of equiformance and source emissions in the field and in the laboratory.

CEE 494 Air-Pollution Control Equipment Design (3) Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particulate pollutants. Actual case studies. Offered: jointly with CHEM E/M E 468.

CEE 495 Sustainability and Design for Environment (3) *Cooper* Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with ENVIR 415/M E 415; S.

CEE 498 Special Topics (1-5, max. 5) Special topics in civil engineering offered as course with lecture and/or laboratory. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree.

CEE 499 Special Projects (1-5, max. 5) Individual undergraduate research projects. Maximum of 6 credits in combination of 498 and 499 may be applied toward an undergraduate degree. Recommended: 400-level CEE course.

CEE 500 Civil and Environmental Engineering Seminars (1) Credit/no credit only. Prerequisite: graduate standing in Civil and Environmental Engineering.

CEE 501 Structural Mechanics (6) *Elias, Miller, Turkiyyah* Equations of a continuum for small displacements, applications to linear elasticity.

Kirchoff plate theory, problems in advanced strength of materials. Virtual work, minimum potential energy, force and displacement methods of structural analysis. Direct stiffness method. Approximate solutions, geometric stiffness matrix. Linearized buckling. Offered: A.

CEE 502 Structural Dynamics (3) *Eberhard, MacRae, Reed* Lagrange's equations. Free vibrations of linear, single, and multiple degree of freedom systems. Damping. Mode superposition. Forced vibrations by time history and by response spectrum methods. Free and forced vibrations of continuous systems. Wave propagation in rods and beams. Prerequisite: CEE 501. Offered: W.

CEE 503 Materials Modeling (3) *Miller, Reed, Roeder* Behavior of materials used in civil engineering structures. Yield and failure surfaces. Physical and phenomenological models of plastic and viscoelastic behavior. Fracture mechanics. Fatigue models and predictions. Damping and friction. Behavior of anisotropic and composite materials.

CEE 504 Finite Element Methods in Structural Mechanics (3) Extension of the matrix methods of structural analysis to the solution of elasticity, plate, and shell problems by use of finite element approximations. Discussion of convergence and bounding and extension to investigation of stability and finite deformations. Prerequisite: CEE 501 or permission of instructor.

CEE 508 Continuum Mechanics (3) *Elias, Miller* General foundation of fundamental concepts of motion, stress, and energy for a continuum. General equations of conservation of mass, momentum, and energy. Linear and nonlinear elastic, viscous, and inelastic materials. Prerequisite: CEE 501. Offered: jointly with A A 575.

CEE 511 Advanced Reinforced Concrete (3) *Eberhard, MacRae, Stanton* Behavior and design of reinforced concrete members and structures. Members subject to torsion and torsion combined with flexure and shear; members with small shear span/depth ratios, slabs. Offered: A.

CEE 512 Advanced Structural Systems (3) *Eberhard, Stanton* Prestress loss. Design of statically indeterminate prestressed concrete structures; continuous beam, frame, and slab structures (cast in place or assembled from precast units). Prerequisite: CEE 453 or equivalent. Offered: Sp.

CEE 513 Advanced Steel I (3) *MacRae, Roeder* Factors influencing strength and serviceability of steel structures; LRFD limit state design procedures. Use of theories of plasticity and stability in development of design methods and specifications, bolted and welded connections, temperature effects, and effect of different fabrication methods on behavior of structure. Prerequisite: CEE 501, CEE 503. Offered: W.

CEE 515 Earthquake Engineering I (3) Earthquake mechanism and ground shaking, response spectra, linear elastic methods for prediction of behavior, displacement prediction methods for inelastically behaving structures, modeling and solution schemes, earthquake design philosophy, capacity design. Reinforced concrete, steel, and base-isolated structures. Prerequisite: CEE 501, CEE 502.

CEE 516 Earthquake Engineering II (3) Performance-based design, development of

fragility curves, characteristics and effects of ground-shaking records, design methods, passive and active control, dynamic inelastic time history analysis, design of parts, system detailing, soil-structure interaction, repair and retrofit of structures. Prerequisite: CEE 515.

CEE 517 Wind Engineering Design (3) Wind effects on structures, including atmospheric boundary layer flow; bluff body aerodynamics; structural dynamics and aeroelasticity; development and use of the ASCE Standards; estimation of along-wind, across-wind, and torsional response of tall buildings; design strategies for avoiding wind-induced discomfort. Fundamentals of wind tunnel testing.

CEE 518 Reliability and Design (3) Introduction to theory of structural reliability and its application to design procedures in civil engineering, including probability theory; assessment of uncertainties; code specification (first-order, second-moment format) and the related concept of risk and the influence of socioeconomic factors; loads, load combinations, and probabilities of damage.

CEE 521 Seepage and Consolidation (3) Confined and unconfined seepage through porous media, flow net solutions, consolidation, settlement, numerical solution of seepage, and consolidation problems. Prerequisite: CEE 366 or equivalent.

CEE 522 Shear Strength and Slope Stability (3) Shear strength of cohesive and cohesionless soils and slope stability analysis of natural and man-made slopes. Prerequisite: CEM 561.

CEE 523 Advanced Foundation Engineering (3) Design of shallow and deep foundations for bearing capacity and settlement. Construction considerations. Prerequisite: CEE 522 and CEE 527.

CEE 524 Lateral Earth Pressures and Retaining Structures (3) Lateral earth pressure theory. Design of temporary and permanent retaining structures including in situ reinforcement. Prerequisite: CEE 522, CEE 527.

CEE 526 Geotechnical Earthquake Engineering (3) Plate tectonics and elastic rebound theory of earthquakes and faults; characterization of ground motions; seismicity; seismic risk analysis; effect of local soil conditions on ground response; development of design ground motions; liquefaction; dynamic lateral earth pressures; seismic slope stability. Prerequisite: CEE 525 or permission of instructor.

CEE 527 Advanced Geotechnical Laboratory (4) Soil and site investigation, classification and engineering properties of soils and rock as determined by standard and advanced test procedures and equipment. Evaluation of test data. Report writing. Prerequisite: CEE 366 or equivalent.

CEE 528 Geosynthetic Engineering (3) Identification and testing of geosynthetics. Design of geosynthetic filters, roadway stabilization, earth reinforcement, and waste containment systems. Prerequisite: CEE 522 and CEE 523.

CEE 529 Foundation Soil Improvement (3) Analysis and design of physical and chemical treatment techniques commonly applied to problem foundation soils for civil engineering structure. Prerequisite: CEE 523.

CEE 530 Engineering Geology II (3) Application of engineering geology fundamentals to: location, design and maintenance of engineered structures; policy decisions related to potential geological hazards. Case histories, governmental policy discussions, interpretation of geological maps for engineering purposes. Prerequisite: graduate standing and CEE 437 or permission of instructor.

CEE 531 Rock Engineering (3) Engineering classification, physical and mechanical properties of rocks, failure modes and initial stresses in rocks, laboratory and field testing of rocks, rock slope engineering, underground openings, foundations on rocks. Prerequisite: graduate standing and CEE 366 or permission of instructor.

CEE 540 Microbiological Process Fundamentals (3) *Stense!* Fundamental concepts for microbial processes including organic chemical structure, nomenclature and environmental properties, principles of microbial metabolism, study of specific types of bacteria important to environmental engineering and their metabolism, development of microbial kinetic equations, including substrate utilization, energetics, and stoichiometry. Prerequisite: permission of instructor.

CEE 541 Biological Treatment Systems (3) Basic reactions, design principles, current design models, and operational considerations for biological treatment systems used in environmental engineering. Applications include activated sludge design and optimization, fixed film reactors, nitrification, nitrogen removal, phosphorus removal, anaerobic treatment, and toxic organics removal. Prerequisite: CEE 540 and CEE 482 or equivalent.

CEE 542 Bioremediation of Environmental Pollutants (3) *Herwig, Strand* Detailed survey of current understanding of biological pathways for transformation and degradation of toxic organic compounds, pesticides, oil, and metals. Microbial and plant transformations of pollutants and requirements for bioremediation. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with ESC 518/MICROM 518; W.

CEE 543 Aquatic Chemistry (3) *Benjamin, Ferguson, Murray* Principles of chemical equilibrium applicable to natural water systems and water and waste treatment processes. Chemical thermodynamics. Characteristics of acid/base, gas/liquid, solid/liquid, oxidation/reduction, and adsorption and equilibria. Computer models for chemical speciation. Prerequisite: Graduate standing or permission of instructor.

CEE 544 Physical-Chemical Treatment Processes (4) Principles and design of major physical-chemical unit processes used in water, wastewater, and hazardous waste treatment. Processes include chemical and reactor kinetics, filtration, chemical coagulation, ion exchange, adsorption, and gas transfer. Development of mathematical models, laboratory demonstrations, and evaluation of current design practice. Prerequisite: CEE 485 or permission of instructor.

CEE 545 Advanced Environmental Chemistry (3) Behavior of controlled chemical species (heavy metals, pesticides, disinfection by-products, and endocrine disruptors) and

persistent organic pollutants in the environment. Modeling of chemical interactions pertinent to environmental technologies (ozonation, advanced oxidation, photochemical transformations, halogenation, dehalogenation, application of zero-valence metals and electrochemical controls). Prerequisite: aquatic chemistry or permission of instructor.

CEE 546 Topics in Ecological Effects of Wastewater (3) Application of ecological concepts for analysis and interpretation of bioenvironmental problems and data (eutrophication, acid rain, and toxicity). Students participate in presentation and discussion of current research. Prerequisite: CEE 462 or BIOL 473 or permission of instructor.

CEE 547 Lake and Watershed Management (3) Application of current techniques for lake and watershed analysis and modeling using fundamentals of limnology. Approaches to restoring eutrophic lakes, land use impacts on water quality. Practical exercises using data from real lake systems. Prerequisite: CEE 462/FISH 434, BIOL 473, or permission of instructor.

CEE 549 Advanced Topics in Environmental Engineering, Chemistry, and Biology (3) Special topics of current importance in environmental engineering. Application of fundamental chemical and biological principles to the study of such phenomena as the behavior of aqueous colloids, corrosion processes, bacterial metabolism in chemically complex solutions, and acid precipitation. May be taken more than once for credit. Prerequisite: CEE 540, CEE 541.

CEE 550 Environmental Chemical Modeling (3) *Benjamin, Murray* Physical/chemical principles controlling the fate and distribution of environmental pollutants, and use of models to apply those principles. Includes modeling of physical transport in conjunction with chemical equilibrium and reaction kinetics. Applications include acid mine drainage, acid deposition, and groundwater and lake water contamination. Offered: jointly with OCEAN 524.

CEE 553 Seminar-Topics in Atmospheric Chemistry (1-3, max. 6) *Charlson, Harrison* Seminar for atmospheric scientists, chemists, engineers in problems associated with the chemical composition of the atmosphere. Covers wide variety of topics, ranging from the natural system to urban pollution and global atmospheric change. Faculty lectures, student participation. Prerequisite: ATM S 301 or permission of instructor. Offered: jointly with ATM S 525.

CEE 554 Acoustics of Environmental Noise (4) Offered: jointly with M E 528.

CEE 555 Topics in Environmental Health (3) Introduction to human biology, including physiology, epidemiology, and toxicology. Study of contemporary environmental health problems and practices as they relate to radiological health, solid-waste disposal, occupational health, biometeorology, and bioengineering.

CEE 556 Hazardous Air Pollution (3) Control of emissions of hazardous or toxic air pollutants. Government regulations, determination of needed control efficiency. Emission control by thermal incineration, catalytic incineration, flares, condensation, carbon adsorption, and absorption (wet and dry). Hazardous waste incinerators. Case studies. Offered: jointly with CHEM E 562.

CEE 557 Air Resources Management (3) Technical, administrative, and legal aspects of air

conservation. Current case studies involving engineering analysis, air-quality modeling, and regulatory aspects at local, state, and federal governmental levels.

CEE 558 Control of Gaseous Air Pollutants (3) Physical and chemical processes used to control gaseous air pollutants. Absorption into liquids. Aqueous spray dryer scrubbers. Adsorption beds. Control of sulfur oxide and nitrogen oxide. Case studies of control systems. Prerequisite: CHEM E 435 or permission of instructor. Offered: jointly with CHEM E 566; even years.

CEE 559 Control of Particulate Air Pollutants (3) Processes used to control emissions of particulate air pollutants. Use of settling chambers, cyclones, fabric filters, wet scrubbers, and electrostatic precipitators to control aerosol particles. Case studies of particulate air-pollutant control systems. Prerequisite: CEE 468 or permission of instructor. Offered: jointly with CHEM E 567; odd years.

CEE 560 Risk Assessment for Environmental Health Hazards (3/4) *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with ENV H 577/PB AF 589; A.

CEE 570 Hydrodynamics (4) Applications of the equations of motion to the flow of ideal and real fluids. Fundamentals of fluid potential motion. Viscous flows; Navier-Stokes equations and some exact solutions. Boundary-layer theory. Introduction to turbulence. Two- and three-dimensional examples, including free surface flows. Applications of field equations to problems of engineering significance. Prerequisite: CEE 342 or equivalent.

CEE 571 Hydrodynamics in Water Quality (3) Theoretical, field study, and laboratory model approaches to diffusion in transport problems of concern to water resources engineers. Prerequisite: CEE 342 or permission of instructor.

CEE 572 Water Wave Mechanics (3) Theory of water waves. Classical water wave problem and approximate solution techniques. Evolution equations for and their solutions wave systems. Viscous damping effects and mass transport. Nonlinear shallow-water waves and the Korteweg-deVries equation. Waves on beaches. Recommended: graduate-level course in fluid mechanics.

CEE 573 Advanced Computational Hydraulics (4) Review of hydrodynamic and transport equations for hydraulic engineering application; numerical solution methods; implementation and practice with existing two- and three-dimensional numerical models; numerical model calibration and verification techniques; case studies. Theoretical and civil engineering decision makers aspects. Prerequisite: CEWA 474, CEE 570, CEE 571 or permission of instructor.

CEE 574 Advanced Hydrology (3) Detailed treatment of statistical methods used in hydrologic analysis. Stochastic hydrology, detailed examination and use of a deterministic watershed model (e.g., Stanford Watershed Model). Prerequisite: graduate standing in civil engineering or permission of instructor.

CEE 575 Groundwater Transport Modeling (3) Review of equations for flow and transport in porous media; techniques for simulating transport as boundary value problems; analytical and numerical solution techniques; finite element models; field-scale applications and case histories.

CEE 576 Water Resources Planning (3) *Palmer* Engineering, social, and economic factors involved in water resource development and management; water policies, programs, and administration; use relationships and conflicts; considerations for regional water resource systems. Offered: W.

CEE 577 Water-Quality Management (3) Application of biological, ecological, and chemical processes to modeling of water quality and use of such models in appropriate management of water resource systems. Includes units on the modeling of temperature, BOD, nutrient, phytoplankton, zooplankton, and other processes in lakes, streams, and estuaries. Recommended: CEE 476, CEE 485, CEE 462/ FISH 434, and CEE 491.

CEE 578 Water Resource System Management and Operations (3) *Burges, Palmer* A readings course in recent literature related to the modeling and management of water resources. Topics include drought management, expansion of existing water supplies, hydropower production, streamflow forecasting, water demand forecasting, regional water planning, climate change, and other topical issues. Recommended: 557, 558. Offered: A.

CEE 579 Advanced Traffic Detection Systems (3) *Wang* Introduction to advanced tracking and detection technologies in transportation engineering, including Global Positioning Systems (GPS), inductance loop detection systems, remote traffic microwave radar, computer-vision based technologies, and other emerging detection technologies with cutting-edge research in these areas.

CEE 580 Urban Transportation Planning (4) *Rutherford* Introduction to transportation planning, including trends and issues, land use and transportation interaction, surveys, public involvement, demand management, technology, forecasting, impacts, and policy strategies.

CEE 581 Travel Demand Forecasting (4) *Rutherford* Application of mathematical models to forecast urban travel behavior. Introduces emerging methods, land use models, travel demand models, including trip generation, trip distribution, mode choice, and network assignment. Discusses validation and ethics.

CEE 582 Intelligent Transportation Systems (3) Application of modern computer and communication technologies to transportation systems. Benefits to public agencies, commercial companies, and travelers. Coordination between private and public sectors. Intelligent Transportation System's (ITS) social, organizational, and operational changes.

CEE 583 Airport Engineering (3) Definitions and terminology relating to airport engineering. Characteristics of aircraft, air traffic control, and resulting impact upon design process. Airport capacity, configuration, and planning associated with terminal design. Emphasis on geometric and structural design of pavements and airside. Design projects relating to airport engineering required. Prerequisite: permission of instructor.

CEE 584 Analytical Methods in Transportation I (3) Application of analytical and statistical methods to transportation planning problems. Analysis of probability distributions that describe variables. Development of statistical models for predicting transportation phenomena. Elementary sampling theory hypothesis testing, regression analysis, time series analysis, applied to transportation data. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

CEE 585 Analytical Methods in Transportation II (3) Applications of advanced econometric methods to transportation issues. Topics include, but not limited to, systems of equations, duration models, limited dependent variable approaches, and count models. Hands-on modeling, with numerous data sets, available for application. Collaborative projects. Prerequisite: CEE 584 or permission of instructor.

CEE 586 Transportation Infrastructure Management (3) **CEE 587 Transportation Networks (3)** *Manning, Shankar* Traffic flow, theories of traffic, user equilibrium and system-optimal assignments, and algorithms used for network assignment. Theoretical and empirical traffic assignments, multivariate characteristics of traffic flow on networks. Interactive work with network and econometric models.

CEE 588 Land Use/Transportation Models (3) Review of theoretical basis of several existing models used to forecast urban growth patterns and their associated land use, transportation, and energy requirements. Model validation studies in relation to empirical studies of urban growth and change. Environmental implications of alternative urban growth patterns. Offered: jointly with URBDP 530.

CEE 589 Transit Systems Planning (3) Planning, operational methods for urban public transportation. Review of technological, operating characteristics of vehicles and systems; financing, management, institutional aspects. Paratransit. Short-range planning, operational strategies, revenue-fare structures. Service monitoring. Mode choice, transit demand relating to service. Computer-aided methods for planning, design of transit systems. Prerequisite: graduate standing or permission of instructor.

CEE 590 Traffic Systems Operations (3) Operational planning, management of arterial and freeway traffic systems. Review of transportation system management strategies to achieve more efficient use of existing infrastructure, including improved and innovative traffic control systems and demand management policies, measures of effectiveness, impact assessment, traveler response. Introduction to use of relevant computer models and packages.

CEE 591 Freight Transportation (3) Overview of the technical and institutional aspects of transporting freight. Topics include the different modes of moving freight, the technology of transferring freight between modes at ports and terminals, issues that impact freight movement such as congestion and government regulation, and the future of freight mobility.

CEE 592 Statistical Fundamentals for Construction and Materials Applications (1) *Mahoney* Overview of statistical measures used in various construction and materials decision-making processes. Subjects include data distributions, hypothesis tests (making decisions with statistics), regression analysis, sampling, and quality control and assurance. Uses

construction data to illustrate these measures. Offered: Sp.

CEE 593 Construction Labor Law (3) *Goldblatt* In-depth study of construction labor topics, including labor-management organization, legislation, and regulation, collective bargaining, and job site administration. Examines importance of labor relations in construction firms, whether in a union setting or an open shop environment.

CEE 594 Computer-Aided Construction (3) *Wang* Application of information technology to construction management and cost estimating. Topics include, but not limited to, computerized construction, fundamentals of computer hardware, construction management software tools, Web publishing, GPS application, and construction data management. Offered: S.

CEE 595 Construction Materials (3) *Mahoney, Muench* Examines the use of aggregates, bituminous mixtures, Portland cement concrete, roller compacted concrete, soil and site stabilization, utility cuts and flowable backfill in construction projects. Emphasis on the behavior of materials in various construction applications. Offered: W.

CEE 596 Pavement Construction (3) *Mahoney, Muench* Examines pavement construction, including pavement contracts and specifications, quality control and assurance programs, and plant and laydown operations. Reviews both national and international pavement construction practices. Offered: Sp.

CEE 597 Construction Productivity (3) Work improvement techniques applied to construction operations. Review of major contributions in behavioral science that may be applicable to the construction industry. Case studies. Innovative productivity programs successfully implemented on construction projects. Safety on construction projects, especially as influenced by managerial practices.

CEE 599 Special Topics in Civil and Environmental Engineering (1-3, max. 15) *Rutherford* Special topics in civil and environmental engineering offered occasionally by permanent or visiting faculty members.

CEE 600 Independent Study or Research (2-5, max. 5) *Rutherford* Topics covered depend on the faculty who offer the course and student interest. Prerequisite: permission of instructor.

CEE 601 Internship (2) Internship in an established program between industry, government, and the University. Prerequisite: permission of graduate program coordinator and committee chair.

CEE 700 Master's Thesis (*) Prerequisite: permission of adviser.

CEE 800 Doctoral Dissertation (*) Prerequisite: permission of adviser.

Computer Science and Engineering

Computer Science and Engineering

CSE 100 Fluency in Information Technology (5) QSR Introduces skills, concepts, and capabilities necessary to effectively use

information technology. Includes logical reasoning, managing complexity, operation of computers and networks, and contemporary applications such as effective Web searching and database manipulation, ethical aspects, and social impacts of information technology. Not available for credit to students who have completed CSE 142 or ENGR 142. Offered: jointly with INFO 100.

CSE 321 Discrete Structures (4) Fundamentals of set theory, graph theory, enumeration, and algebraic structures, with applications in computing. Prerequisite: CSE 143; either MATH 126, MATH 129, or MATH 136.

CSE 322 Introduction to Formal Models in Computer Science (3) Finite automata and regular expressions; context-free grammars and pushdown automata; nondeterminism; Turing machines and the halting problem. Emphasis on understanding models and their applications and on rigorous use of basic techniques of analysis. Induction proofs, simulation, diagonalization, and reduction arguments. Prerequisite: CSE 321.

CSE 326 Data Structures (4) Data types, abstract data types, and data structures. Efficiency of algorithms. Sequential and linked implementation of lists. Binary tree representations and traversals. Searching: dictionaries, priority queues, hashing. Directed graphs, depth-first algorithms. Garbage collection. Dynamic storage allocation. Internal and external sorting. No credit to students who have completed CSE 373, CSE 374, or E E 374. Prerequisite: CSE 321.

CSE 341 Programming Languages (4) Basic concepts of programming languages, including abstraction mechanisms, types, and scoping. Detailed study of several different programming paradigms, such as functional, object-oriented, and logic programming. No credit if CSE 413 has been taken. Prerequisite: CSE 143.

CSE 370 Introduction to Digital Design (4) Introductory course in digital logic and its specification and simulation. Boolean algebra, combinational circuits including arithmetic circuits and regular structures, sequential circuits including finite-state-machines, use of programmable logic devices. Simulation and high-level specification techniques are emphasized.

CSE 373 Data Structures and Algorithms (3) Fundamental algorithms and data structures for implementation. Techniques for solving problems by programming. Linked lists, stacks, queues, directed graphs. Trees: representations, traversals. Searching (hashing, binary search trees, multiway trees). Garbage collection, memory management. Internal and external sorting. No credit to students who have completed 326, 374, or E E 374. Prerequisite: CSE 143.

CSE 378 Machine Organization and Assembly Language (4) Differences and similarities in machine organization; central processors; fundamentals of machine language and addressing; assembly language programming, including macros; operating system interfaces. No credit to students who have completed 410. Prerequisite: CSE 143; CSE 370.

CSE 399 CSE Foreign Study (*) Upper division computer science or computer engineering course, taken through an approved study abroad program, which there are no direct University of Washington equivalents. Credit/no credit only.

CSE 401 Introduction to Compiler Construction (3) Fundamentals of compilers and interpreters; symbol tables; lexical analysis, syntax analysis, semantic analysis, code generation, and optimizations for general purpose programming languages. No credit to students who have taken 413. Prerequisite: CSE 322; CSE 326; CSE 341; CSE 378.

CSE 403 Software Engineering (4) Fundamentals of software engineering using a group project as the basic vehicle. Topics covered include the software crisis, managing complexity, requirements specification, architectural and detailed design, testing and analysis, software process, and tools and environments. Prerequisite: CSE 326; CSE 341; recommended: project experience in an academic or work setting.

CSE 410 Computer Systems (3) Structure and components of hardware and software systems. Machine organization, including central processor and input-output architectures; assembly language programming; operating systems, including process, storage, and file management. No credit to students who have completed 378 or 451. Prerequisite: CSE 373.

CSE 415 Introduction to Artificial Intelligence (3) NW Principles and programming techniques of artificial intelligence: LISP, symbol manipulation, knowledge representation, logical and probabilistic reasoning, learning, language understanding, vision, expert systems, and social issues. Not open for credit to students who have completed 473. Prerequisite: CSE 373.

CSE 417 Algorithms and Computational Complexity (3) Design and analysis of algorithms and data structures. Efficient algorithms for manipulating graphs and strings. Fast Fourier Transform. Models of computation, including Turing machines. Time and space complexity. NP-complete problems and undecidable problems. Prerequisite: CSE 373.

CSE 421 Introduction to Algorithms (3) Techniques for design of efficient algorithms. Methods for showing lower bounds on computational complexity. Particular algorithms for sorting, searching, set manipulation, arithmetic, graph problems, pattern matching. Prerequisite: CSE 322; CSE 326.

CSE 431 Introduction to Theory of Computation (3) Models of computation, computable and noncomputable functions, space and time complexity, tractable and intractable functions. Prerequisite: CSE 322.

CSE 444 Introduction to Database Systems (3) Fundamental concepts, system organization, and implementation of database systems. Relational, hierarchical, and network data models; file organizations and data structures; query languages; query optimization; database design; concurrency control; security; issues involving distributed database systems. Prerequisite: CSE 326.

CSE 450 Animation Production Seminar (1) Open to all students who have an interest in digital animation. Reviews and analyzes films, animated feature films, and television commercials. Emphasizes the technical and aesthetic basics of animation production in industry studio environments.

CSE 451 Introduction to Operating Systems (4) Principles of operating systems. Process management, memory management, auxiliary

storage management, resource allocation. No credit to students who have completed 410 or E 474. Prerequisite: CSE 326; CSE 378.

CSE 454 Advanced Internet and Web Services (5) Design of Internet search engines, including spider architecture, inverted indices, frequency rankings, latent semantic indexing, hyperlink analysis, and refinement interfaces. Construction of scalable and secure web services. Datamining Webserver logs to provide personalized and user-targeted services. Large project. Prerequisite: CSE 326.

CSE 456 Story Design for Computer Animation (4) Animation principles and production for story development and design. Design, development, and production of several storyreels, which are a tool for the pre-production of animated features and shorts. Student use authoring tools to present finished work.

CSE 458 Computer Animation (5) Introduction to basic principles of computer generated animation. Focus on the modeling and lighting of animated characters. Students from Art, CSE, and Music team up on projects to be built on commercially-available modeling and lighting packages. Prerequisite: either CSE 457, ART 380, or MUSIC 403.

CSE 459 Pre-Production for Collaborative Animation (5) Pre-production of collaboratively designed animated shorts. In-depth analysis of classical and computer generated works. Character design and pre-planning, model sheets, character rigging, storyreel and animatics, character motion, design for multiple characters, and principles of animation as applied to character motion and effects. Prerequisite: CSE 458.

CSE 460 Animation Capstone (5) Apply the knowledge gained in previous animation courses to produce a short animated film. Topics include scene planning, digital cinematography, creature and hard surface modeling, animatics and basics of character animation, and rendering techniques. Prerequisite: CSE 458, CSE 459.

CSE 461 Introduction to Computer-Communication Networks (4) Computer network architectures, protocol layers, network programming, Transmission media, encoding systems, switching, multiple access arbitration. Network routing, congestion control, flow control. Transport protocols, real-time, multicast, network security. Prerequisite: CSE 143; either MATH 390/STAT 390, STAT 391, IND E 315, or CSE 321. Offered: jointly with E 461.

CSE 464 Advanced Topics in Digital Animation (5) Students design individual animated works for professional quality demo reels. 2- and 3-D animatics, special effects design, advanced character animation techniques, 3-D paint techniques and integration, short design, sequence planning, non-photorealistic rendering options, interactive animation for pre-planning, and advanced production techniques and strategies. Prerequisite: CSE 458.

CSE 466 Software for Embedded Systems (4) Software issues in the design of embedded systems. Microcontroller architectures and peripherals, embedded operating systems and device drivers, compilers and debuggers, timer and interrupt systems, interfacing of devices, communications and networking. Emphasis on practical application of development platforms. Prerequisite: CSE 326; CSE 370; CSE 378.

CSE 467 Advanced Digital Design (4) Advanced techniques in the design of digital systems. Hardware description languages, combinational and sequential logic synthesis and optimization methods, partitioning, mapping to regular structures. Emphasis on reconfigurable logic as an implementation medium. Memory system design. Digital communication including serial/parallel and synchronous/asynchronous methods. Prerequisite: CSE 326; CSE 370.

CSE 468 Very Large Scale Integration (5) Introduction to CMOS technology and circuit design; implementation of combinational and sequential logic; VLSI design methodologies; CAD tools for layout, simulation, and validation. Students design a VLSI chip using modern CAD tools. Prerequisite: CSE 370.

CSE 471 Computer Design and Organization (4) CPU instruction addressing models, CPU structure and functions, computer arithmetic and logic unit, register transfer level design, hardware and microprogram control, memory hierarchy design and organization, I/O and system components interconnection. Laboratory project involves design and simulation of an instruction set processor. Prerequisite: CSE 370; CSE 378.

CSE 472 Introduction to Computational Linguistics (5) NW/VLPA Hoard Introduction to computer applications of linguistic theory, including syntactic processing, semantic and pragmatic interpretation, and natural language generation. Prerequisite: either LING 200 or LING 400; either LING 461 or CSE 321. Offered: jointly with LING 472.

CSE 473 Introduction to Artificial Intelligence (3) Principal ideas and developments in artificial intelligence: theorem proving, problem-solving methods, representation of knowledge, natural language analysis and synthesis, programming languages for artificial intelligence. Not open for credit to students who have completed 415. Prerequisite: CSE 326; recommended: CSE 341.

CSE 476 Embedded System Design (5) System building course to provide students with a complete experience in embedded system design. Students will design, simulate, construct, debug, and document a substantial project of their choosing. Lectures will focus on case studies and emerging components and platforms. Prerequisite: CSE 451; CSE 466.

CSE 477 Digital System Design (5) Capstone design experience. Prototype a substantial project mixing hardware, software, and communication components. Focuses on use of embedded processors and programmable logic in digital system design, case studies, and emerging components and platforms. Provides a complete experience in embedded system design and management. Prerequisite: CSE 451; CSE 466; CSE 467.

CSE 490 Special Topics in Computer Science and Engineering (1-5, max. 15) Lectures, discussions, and possibly labs on topics of current interest in computer science and engineering not covered by other CSE undergraduate courses.

CSE 497 Undergraduate Research Seminar (1) Students prepare and give a public talk on their faculty-sponsored research projects.

CSE 498 Senior Project ([1-9]-, max. 9) A report (and perhaps demonstration) describing a development, survey, or small research project in

computer science or an application to another field. Objectives are: (1) integrating material from several courses, (2) introducing the professional literature, (3) gaining experience in writing a technical document, and (4) showing evidence of independent work. Work normally extends over more than one quarter, for a maximum of 6 credits for 498; 9 credits are required for 498H.

CSE 499 Reading and Research (1-24, max. 24) Available in special situations for advanced computer science majors to do reading and research in field, subject to approval of undergraduate adviser and CSE faculty member. Free elective, but does not replace core course or computer science elective. Credit/no credit only.

CSE 500 Computers and Society (2) Study of impact of computer technology on present and future society, including political, economic, cultural, social, and moral issues. Includes guest lecturers and discussion leaders. Each student is required to complete a term project. Credit/no credit only. Prerequisite: graduate standing in computer science or permission of instructor.

CSE 503 Software Engineering (3) Specification, implementation, and testing of large, multiperson, software systems. Topics include abstraction, information hiding, software development environments, and formal specifications. Prerequisite: CSE major and CSE 322, CSE 326, and CSE 378 or equivalents.

CSE 504 Advanced Topic in Software Engineering (3) Topics vary but may include software design and evolution, formal methods, requirements specifications, software and system safety, reverse engineering, real-time software, metrics and measurement, programming environments, and verification and validation. Prerequisite: CSE major or permission of instructor.

CSE 506 Advanced Topics in Programming Languages (3) May include functional, object-oriented, parallel, and logic programming languages; semantics for languages of these kinds; type declaration, inference, and checking (including polymorphic types); implementation issues, such as compilation, lazy evaluation, combinators, parallelism, various optimization techniques. Implementation project required. Prerequisite: CSE major, CSE 501 which may be taken concurrently, and CSE 505.

CSE 510 Advanced Topics in Human-Computer Interaction (3) Content varies, including interface issues for networks, embedded systems, education applications, safety and critical systems, graphics and virtual reality, databases, and computer-supported cooperative work.

CSE 515 Statistical Methods in Computer Science (3) Introduction to the probabilistic and statistical techniques used in modern computer systems. Graphical models, probabilistic inference, statistical learning, sequential models, decision theory. Prerequisite: either STAT 341 or STAT 391, and graduate standing in computer science, or permission of instructor.

CSE 519 Current Research in Computer Science (1, max. 3) Weekly presentations on current research activities by members of the department. Only Computer Science graduate students may register, although others are encouraged to attend. Credit/no credit only.

CSE 520 Computer Science Colloquium (1, max. 9) Weekly public presentations on topics of current interest by visiting computer scientists. Credit/no credit only.

CSE 521 Design and Analysis of Algorithms I (3) Principles of design of efficient algorithms: recursion, divide and conquer, balancing, dynamic programming, greedy method, data structure selection. Correctness and analysis of algorithms. Examples drawn from problems in sorting, searching, set manipulation, pattern-matching, graphs, matrices, polynomials, and integers. Prerequisite: CSE major and CSE 326 or equivalent.

CSE 522 Design and Analysis of Algorithms II (3) Analysis of algorithms more sophisticated than those treated in 521. Content varies and may include such topics as algebraic algorithms, combinational algorithms, techniques for proving lower bounds on complexity, and algorithms for special computing devices such as networks or formulas. Prerequisite: CSE major and CSE 521.

CSE 523 Computational Geometry (3) Algorithms for discrete computational geometry. Geometric computation, range searching, convex hulls, proximity, Voronoi diagrams, intersection. Application areas include VLSI design and computer graphics. Prerequisite: CSE major and CSE 521; recommended: CSE 457 or equivalent.

CSE 524 Parallel Algorithms (3) Design and analysis of parallel algorithms: fundamental parallel algorithms for sorting, arithmetic, matrix and graph problems and additional selected topics. Emphasis on general techniques and approaches used for developing fast and efficient parallel algorithms and on limitations to their efficacy. Prerequisite: CSE major and CSE 521.

CSE 527 Computational Biology (3) Introduces computational methods for understanding biological systems at the molecular level. Problem areas such as mapping and sequencing, sequence analysis, structure prediction, phylogenetic inference, regulatory analysis. Techniques such as dynamic programming, Markov models, expectation-maximization, local search. Prerequisite: graduate standing in biological, computer, mathematical or statistical science, or permission of instructor.

CSE 528 Computational Neuroscience (3) Introduction to computational methods for understanding nervous systems and the principles governing their operation. Topics include representation of information by spiking neurons, information processing in neural circuits, and algorithms for adaptation and learning. Prerequisite: elementary calculus, linear algebra, and statistics, or by permission of instructor. Offered: jointly with NEUBEH 528.

CSE 531 Computability and Complexity (3) Computational models including deterministic and nondeterministic Turing machines, and techniques for analyzing them. Fundamentals of computability theory and undecidability. Fundamentals of computational complexity theory and NP-completeness. Prerequisite: CSE majors only; CSE 322 or equivalent.

CSE 532 Complexity Theory (3) Deterministic, nondeterministic, alternating, and probabilistic Turing machines. Time and space complexity, complexity classes, complexity hierarchies, and provably intractable problems. Prerequisite: CSE major and CSE 531.

CSE 533 Advanced Topics in Complexity Theory (3) Topics in computational complexity more sophisticated than those treated in 532. Topics are expected to vary from year to year, but might typically focus on such areas as parallel complexity, probabilistic complexity, circuit- or automaton-based complexity, or logic. Prerequisite: CSE major.

CSE 536 Theory of Distributed Computing (3) Formal approaches to distributed computing problems. Topics vary, but typically include models of distributed computing, agreement problems, impossibility results, mutual exclusion protocols, concurrent reading while writing protocols, knowledge analysis of protocols, and distributed algorithms. Prerequisite: CSE major.

CSE 540 Discrete System Simulation (3) Principles of simulation of discrete, event-oriented systems. Model construction, simulation and validation. Distributed and parallel simulation techniques. Basic statistical analysis of simulation inputs and outputs. Use of C, an object-oriented language, and S, a statistical analysis package. Prior familiarity with the concepts of probability and statistics desirable. Prerequisite: CSE major.

CSE 543 Computer System Performance (3) Emphasizes the use of analytic models as tools for evaluating the performance of centralized, distributed, and parallel computer systems. Prerequisite: CSE major and CSE 451.

CSE 544 Principles of Database Systems (3) Data models and query languages (SQL, datalog, OQL). Relational databases, enforcement of integrity constraints. Object-oriented databases and object-relational databases. Principles of data storage and indexing. Query-execution methods and query optimization algorithms. Static analysis of queries and rewriting of queries using views. Data integration. Data mining. Principles of transaction processing.

CSE 546 Data Mining (3) Methods for identifying valid, novel, useful, and understandable patterns in data. Induction of predictive models from data: classification, regression, and probability estimation. Discovery of clusters and association rules.

CSE 548 Computer Systems Architecture (3) Notations for computer systems. Processor design (single chip, look-ahead, pipelined, data flow). Memory hierarchy organization and management (virtual memory and caches). Microprogramming. I/O processing. Multiprocessors (SIMD and MIMD). Prerequisite: CSE major and CSE 451.

CSE 549 High-Performance Computer Architectures (3) Algorithm design, software techniques, computer organizations for high-performance computing systems. Selected topics from: VLSI complexity for parallel algorithms, compiling techniques for parallel and vector machines, large MIMD machines, interconnection networks, reconfigurable systems, memory hierarchies in multiprocessors, algorithmically specialized processors, data flow architectures. Prerequisite: CSE major and CSE 548 or permission of instructor.

CSE 551 Operating Systems (3) Operating system design and construction techniques. Concurrent programming, operating system kernels, correctness, deadlock, protection, transaction processing, design methodologies,

comparative structure of different kinds of operating systems, and other topics. Prerequisite: CSE major and CSE 451.

CSE 552 Distributed and Parallel Systems (3) Principles, techniques, and examples related to the design, implementation, and analysis of distributed and parallel computer systems. Prerequisite: CSE major and CSE 551.

CSE 553 Real-Time Systems (3) Design and construction of software for real-time computer systems. Software architectures. Requirements and specification methods. Scheduling algorithms and timing analysis. Real-time operating systems. Real-time programming languages. Selected case studies. Prerequisite: CSE major and CSE 451.

CSE 557 Computer Graphics (3) Introduction to image synthesis and computer modeling, emphasizing the underlying theory required for undertaking computer graphics research. Topics include color theory, image processing, affine and projective geometry, hidden-surface determination, photorealistic image synthesis, advanced curve and surface design, dynamics, realistic character animation. Prerequisite: CSE major, solid knowledge of linear algebra.

CSE 558 Special Topics in Computer Graphics (3) Advanced topics in computer graphics not treated in CSE 557. Topics vary from year to year but typically include advanced aspects of image synthesis, animation, and 3D photography. Prerequisite: CSE major and CSE 557 or permission of instructor.

CSE 561 Computer Communication and Networks (3) Fundamentals of data transmission: coding, message formats, and protocols. Organization of computer networks. Examples of network implementations. Prerequisite: CSE or E E major and CSE 451 or equivalent.

CSE 563 Fault Tolerant Computing (3) Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with E E 563.

CSE 567 Principles of Digital Systems Design (3) Principles of logic design, combinational and sequential circuits, minimization techniques, structured design methods, CMOS technology, complementary and ratioed gates, delay estimation and performance analysis, arithmetic circuits, memories, clocking methodologies, synthesis and simulation tools. VLSI processor architecture. Prerequisite: CSE major and basic knowledge of logic design.

CSE 568 Introduction to VLSI Systems (3) Introduction to CMOS technology and circuit design; combinational logic-design alternatives; register-design and system-clocking methodologies; datapath and subsystem design; VLSI system-design methodologies; CAD tools for synthesis, layout, simulation, and validation; design of a complex VLSI chip. Prerequisite: CSE 567 or permission of instructor. CSE majors only.

CSE 571 AI-based Mobile Robotics (3) Overview of mobile robot control and sensing. Behavior-based control, world modeling,

localization, navigation, and planning Probabilistic sensor interpretation, Bayes filters, particle filters. Projects: Program real robots to perform navigation tasks. Prerequisite: CSE major and CSE 473, or permission of instructor.

CSE 573 Artificial Intelligence I (3) Introduction to computational models of thought and construction of intelligent information systems. Topics include search algorithms, data dependencies and truth-maintenance systems, approaches to knowledge representation, automated deduction, reasoning under uncertainty, and machine learning. Prerequisite: CSE 421 or equivalent; exposure to logic, LISP programming experience, CSE major.

CSE 574 Artificial Intelligence II (3) Advanced topics in artificial intelligence. Subjects include planning, natural language understanding, qualitative physics, machine learning, and formal models of time and action. Students are required to do projects. Prerequisite: CSE major and CSE 573.

CSE 576 Computer Vision (3) Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures. Prerequisite: Solid knowledge of linear algebra, good programming skills, CSE or E E major or permission of instructor. Offered: jointly with E E 576.

CSE 577 Special Topics in Computer Vision (3) Topics vary and may include vision for graphics, probabilistic vision and learning, medical imaging, content-based image and video retrieval, robot vision, or 3D object recognition. Prerequisite: CSE/E E 576 or permission of instructor. Offered: jointly with E E 577.

CSE 581 Parallel Computation in Image Processing (3) Parallel architectures, algorithms, and languages for image processing. Cellular array, pipelined and pyramid machines, instruction sets, and design issues. Parallel implementations of filtering, edge detection, segmentation, shape, stereo, motion, relaxation algorithms, multiresolution methods, and iconic-to-symbolic transforms. Students write and debug programs for parallel computers. Prerequisite: permission of instructor.

CSE 590 Research Seminar (*) Several offerings each quarter, on topics of current interest. Prerequisite: permission of instructor.

CSE 591 Group Projects in Computer Science (1-3, max. 3) Focuses on specialized topics and research activities in computer science. Credit/no credit only.

CSE 597 Performance Analysis (4) Broad introduction to computer system performance evaluation techniques and their application. Includes measurement/benchmarking, stochastic and trace driven simulation, stochastic queuing networks, and timed Petri nets. Applications of the techniques are studied using case study papers. CSE majors only. Not open for credit to students who have completed CSE 543.

CSE 600 Independent Study or Research (*) Credit/no credit only.

CSE 700 Master's Thesis (*) Credit/no credit only.

CSE 800 Doctoral Dissertation (*) Credit/no credit only.

Computer Science and Engineering Professional Master's Program

CSE P 501 Compiler Construction (4) Principles and practice of building efficient implementations of modern programming languages. Lexical, syntactic, and semantic analysis of programs. Intermediate program representations. Intra- and interprocedural analysis and optimization. Run-time system techniques. Related programming environment facilities such as source-level debuggers and profilers. Prerequisite: CSE majors only.

CSE P 503 Principles of Software Engineering (4) Study of major developments in software engineering over the past three decades. Topics may include design (information hiding, layering, open implementations), requirements specification (informal and formal approaches), quality assurance (testing, verification and analysis, inspections), reverse and re-engineering (tools, models, approaches). Prerequisite: CSE majors only.

CSE P 505 Programming Languages (4) A study of non-imperative programming paradigms such as functional, object-oriented, logic, and constraint programming. Programming language semantics and type theory. Prerequisite: CSE majors only.

CSE P 510 Human Computer Interaction (4) Topics in human-computer interaction, including tools and skills for user interface design, user interface software architecture, rapid prototyping and iterative design, safety and critical systems, evaluation techniques, and computer supported cooperative work. Prerequisite: CSE majors only.

CSE P 521 Applied Algorithms (4) Principles of design of efficient algorithms with emphasis on algorithms with real world applications. Examples drawn from computational geometry, biology, scientific computation, image processing, combinatorial optimization, cryptography, and operations research. Prerequisite: CSE majors only.

CSE P 524 Parallel Computation (4) Survey of parallel computing including the processing modes of pipelining, data parallelism, thread parallelism, and task parallelism; algorithmic implications of memory models; shared memory and message passing; hardware implementations; bandwidth and latency; synchronization, consistency, interprocessor communication; programming issues including implicit and explicit parallelism, locality, portability. CSE majors only.

CSE P 544 Database Management System (4) Introduction to the principles of database management systems. Topics include database system architecture, data models, theory of database design, query optimization, concurrency control, crash recovery, and storage strategies. CSE majors only.

CSE P 545 Transaction Processing (4) Technology supporting reliable large-scale distributed computing, including transaction programming models, TP monitors, transactional communications, persistent queuing, software fault tolerance, concurrency control and recovery algorithms, distributed transactions, two-phase

commit, data replication. Prerequisite: CSE majors only.

CSE P 546 Data Mining (4) Methods for identifying valid, novel, useful, and understandable patterns in data. Induction of predictive models from data: classification, regression, probability estimation. Discovery of clusters and association rules.

CSE P 548 Computer Architecture (4) Architecture of the single-chip microprocessor: instruction set design and processor implementation (pipelining, multiple issue, speculative execution). Memory hierarchy: on-chip and off-chip caches, TLBs and their management, virtual memory from the hardware viewpoint. I/O devices and control: buses, disks, and RAIDs. Prerequisite: CSE majors only.

CSE P 557 Current Trends in Computer Graphics (4) Introduction to computer image synthesis, modeling, and animation emphasizing the state-of-the-art algorithm applications. Topics may include visual perception, image processing, geometric transformations, hierarchical modeling, hidden-surface elimination, shading, ray-tracing, anti-aliasing, texture mapping, curves, surfaces, particle systems, dynamics, realistic character animation, and traditional animation principles. Prerequisite: CSE majors only.

CSE P 561 Network Systems (4) Current choices and challenges in network systems. Fundamental concepts combined with emphasis on evaluation of design/operations alternatives. Topics include alternative link, network, and transport-layer technologies, topologies, routing, congestion control multimedia, IPv6, aTm v. IP, network management and policy issues. Prerequisite: CSE majors only.

CSE P 567 Design and Implementation of Digital Systems (4) Overview of current implementation technologies for digital systems including custom integrated circuits, field-programmable logic, and embedded processors. Systems components such as buses and communications structures, interfaces, memory architectures, embedded systems, and application-specific devices. Focus on the design of large systems using modern CAD tools. Prerequisite: CSE majors only.

CSE P 573 Applications of Artificial Intelligence (4) Introduction to the use of Artificial Intelligence tools and techniques in industrial and company settings. Topics include foundations (search, knowledge representation) and tools such as expert systems, natural language interfaces and machine learning techniques. Prerequisite: CSE majors only.

CSE P 576 Computer Vision (4) Provides an overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures.

CSE P 590 Special Topics in Computer Science (1-4, max. 20).

CSE P 595 Software Entrepreneurship (4) Provides an overview of the major elements of entrepreneurial activity in software, including market identification and analysis, evaluation and planning of the business, financing, typical operating and administrative problems, and alternatives for growth or sale.

CSE P 596 Business Basics Computer Science Professionals (4) Business principles relevant to the software industry in four areas: competitive strategy, finance, accounting, and human resources. Organized as a series of case studies and lectures. Progresses from an emphasis on tools to a more high-level look at competitive dynamics in high-tech industries.

CSE P 600 Independent Study or Research (1-4, max. 8).

Electrical Engineering

E E 233 Circuit Theory (5) Electric circuit theory. Analysis of circuits with sinusoidal signals. Phasors, system functions, and complex frequency. Frequency response. Computer analysis of electrical circuits. Power and energy. Two port network theory. Laboratory in basic electrical engineering topics. Prerequisite: 1.0 in E E 215.

E E 271 Digital Circuits and Systems (5) Overview of digital computer systems. Digital logic, Boolean algebra, combinational and sequential circuits and logic design, programmable logic devices, and the design and operation of digital computers, including ALU, memory, and I/O. Weekly laboratories. Prerequisite: CSE 142.

E E 299 Special Topics in Electrical Engineering (1-5, max. 5) New and experimental approaches to basic electrical engineering. May include design and construction projects.

E E 331 Devices and Circuits I (5) Physics, characteristics, applications, analysis, and design of circuits using semiconductor diodes and field-effect transistors with an emphasis on large-signal behavior and digital logic circuits. Classroom concepts are reinforced through laboratory experiments and design exercises. Prerequisite: 1.0 in E E 233.

E E 332 Devices and Circuits II (5) Characteristics of bipolar transistors, large- and small- signal models for bipolar and field effect transistors, linear circuit applications, including low and high frequency analysis of differential amplifiers, current sources, gain stages and output stages, internal circuitry of op-amps, op-amp configurations, op-amp stability and compensation. Weekly laboratory. Prerequisite: 1.0 in E E 331.

E E 341 Discrete Time Linear Systems (5) Discrete time signals and systems, impulse response, convolution, Z-transforms, discrete time Fourier analysis. Computer laboratory. Prerequisite: 1.0 in E E 235.

E E 351 Energy Systems (5) Develops understanding of modern energy systems through theory and analysis of the system and its components. Discussions of generation, transmission and utilization are complemented by environmental and energy resources topics as well as electromechanical conversion, power electronics, electric safety, renewable energy, and electricity blackouts. Prerequisite: 1.0 in E E 233.

E E 399 Special Topics in Electrical Engineering (1-5, max. 5) New and experimental approaches to current electrical engineering problems. May include design and construction projects.

E E 400 Advanced Topics in Electrical Engineering (1-5, max. 10) Contemporary topics

at the advanced undergraduate elective level. Faculty presents advanced elective topics not included in the established curriculum.

E E 401 Engineering Design in Large Teams (4) Engineering design process, including project management, team formation, working with technical literature, concept development (e.g., brainstorming, morphological analysis, biomimetics, theory of inventive problem solving), intellectual property, high-tech ventures. Prerequisite: E E 215.

E E 402 Engineering Design in Large Teams: Robotics II (5) Engineering design process applied to robot design. Involves project management, mentoring, marketing, and multi-disciplinary collaboration. The team designs, prototypes, manufactures, assembles, tests, modifies, troubleshoots, and learn to operate a system that competes in an international design contest. Prerequisite: E E 215; E E 401.

E E 406 Engineering Design for K-12 Outreach (3) *Wilson* Design process targeted toward development of relevant activities for K-12 audiences in such areas of science and engineering. Instruction in basic design process, design specification combined with an overview of relevant cognitive/social development in K-12. Prerequisite: either E E 271, E E 331, E E 341, E E 351 or E E 361.

E E 415 Computer-Aided System Analysis and Design (3) Concepts, principles, and techniques concerned with the design, testing, and application of general-purpose problem-oriented computer programs for analyzing large-scale systems. Offered: Sp.

E E 418 Network Security and Cryptography (3) Fundamental principles of cryptography and its application to network and communication security. An introduction to the fundamental tools in cryptography and the protocols that enable its application to network and communication security. Prerequisite: MATH 308; either MATH 390, STAT 390, or IND E 315. Offered: Sp.

E E 420 Design in Communications (4) Design projects in communications. Frequent projects solved by student teams. Reports and presentations. Prerequisite: 1.0 in E E 417 which may be taken concurrently.

E E 433 Analog Circuit Design (5) Design of analog circuits and systems applying modern integrated circuit technology: operational amplifiers, differential amplifiers, active filters, voltage references and regulators. Prerequisite: 1.0 in E E 332.

E E 436 Medical Instrumentation (4) Introductory course in the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For upper-division and first-year graduate students who are preparing for careers in bioengineering-both research and industrial. Offered: jointly with BIOEN 436.

E E 440 Introduction to Digital Imaging Systems (4) *Hwang* Image representation and standards, visual perception and color spaces, spatial domain image filtering and enhancement, image restoration, image transforms, image and video coding, image geometrical transformation and camera modeling. Prerequisite: E E 341.

E E 442 Digital Signals and Filtering (3) Methods and techniques for digital signal processing. Review of sampling theorems, A/D and D/A converters. Demodulation by quadrature sampling. Z-transform methods, system functions, linear shift-invariant systems, difference equations. Signal flow graphs for digital networks, canonical forms. Design of digital filters, practical considerations, IIR and FIR filters. Digital Fourier transforms and FFT techniques. Prerequisite: 1.0 in E E 341.

E E 443 Design and Application of Digital Signal Processing (5) Application of learned theories/algorithms and available computer technologies to modern image and speech processing problems. Two-dimensional signals and systems. Image transform, enhancement, restoration, coding. Characteristics of speech signals, linear predictive coding (LPC) of speech, pitch detection, and LPC speech synthesis, speech recognition, hardware designs for signal processing. Prerequisite: 1.0 in E E 442. Offered: Sp.

E E 447 Control System Analysis I (4) Linear Servomechanism theory and design principles. Pole-zero analysis, stability of feedback systems by root locus and real-frequency response methods. Design methods of Bode and Nichols. Introduction to advanced topics in automatic control theory, state variable methods. Prerequisite: E E 233; E E 235.

E E 448 Control Systems Sensors and Actuators (3) Study of control systems components and mathematical models. Amplifiers, DC servomotors, reaction mass actuators. Accelerometers, potentiometers, shaft encoders and resolvers, proximity sensors, force transducers, piezoceramic materials, gyroscopes. Experimental determination of component models and model parameters. Two 3-hour laboratories per week. Prerequisite: either A A 447 or E E 447. Offered: jointly with A A 448.

E E 449 Design of Automatic Control Systems (4) Design problems for aerospace vehicles, systems with unstable dynamics, lightly damped modes, nonminimum phase, nonlinear dynamics. Computer-aided analysis, design, and simulation, with laboratory hardware-in-the-loop testing. Team design reviews, oral presentations. Prerequisite: either A A 448 or E E 448. Offered: jointly with A A 449.

E E 452 Power Electronics Design (5) Electronic conversion and control of electrical power. Includes semiconductor switching devices, power converter circuits, design of magnetics, and control of power converters. Also ac/ac, ac/dc, and dc/dc power converters; circuit simulation; extensive laboratory work a four-week power converter design project. Prerequisite: 1.0 in E E 332; 1.0 in E E 351.

E E 453 Electric Drives (5) Elements of drive systems, speed-torque characteristics of electric motors and industrial loads, solid-state converter. Starting and braking methods of loaded motors. Speed control of electric motors. Solid-state drives. Transient analysis of loaded motors. Special forms of individual- and multimotor drives. Prerequisite: 1.0 in E E 351.

E E 454 Power System Analysis (4) Introduction to methods of analyzing power systems. Includes symmetrical components, calculation of line parameters, representation of transmission lines and power components, and power flow control. Prerequisite: 1.0 in E E 351.

E E 455 Power System Dynamics and Protection (4) Analysis of symmetrical and unsymmetrical power systems' networks, fault analysis, and stability studies. Prerequisite: 1.0 in E E 351.

E E 456 Computer-Aided Design in Power Systems (4) Design-oriented course in power system engineering. Students are assigned a project concerning system operation and planning, steady-state and dynamic behaviors of power systems, or distribution systems. Each involves formulation of design criteria, development of approach, application of existing software. Prerequisite: either 1.0 in E E 454 or 1.0 in E E 455.

E E 457 Electric Energy Distribution Systems (4) Introduction to electric utility distribution systems. Primary and secondary network analysis and design, distribution substation problems, distribution transformers, capacitor application, overcurrent and overvoltage protection. System planning and reliability. Prerequisite: 1.0 in E E 351.

E E 461 Introduction to Computer-Communication Networks (4) Computer network architectures, protocol layers, network programming. Transmission media, encoding systems, switching, multiple access arbitration. Network routing, congestion control, flow control. Transport protocols, real-time, multicast, network security. Prerequisite: CSE 143; either MATH 390/STAT 390, STAT 391, IND E 315, or CSE 321. Offered: jointly with CSE 461.

E E 462 Principles of Mobile Robotics (4) Design-oriented course in autonomous mobile robots. C programming, microprocessors, motors, gears, sensors, advanced sensing techniques, serial communications, PID control, algorithmic control, reactive control, multi-tasking. Laboratory exercises include design, construction, and testing of autonomous mobile robots, which compete at the end of the term.

E E 463 Autonomous Mobile Robots (4) Design-oriented course in autonomous mobile robots. C programming, motors, sensors, IR and RF wireless communication, digital image processing, and robot motion control. Laboratory exercises include design, construction, and testing of autonomous mobile robots, which compete at the end of term. Prerequisite: E E 462.

E E 465 Fiber Optics, Devices, and Applications (4) Wave propagation in optical waveguiding structures, signal distortion, coupling of modes, modulation, sources and detectors, fabrication and measurement methods, communication and sensor systems. Prerequisite: 1.0 in E E 332; recommended: E E 361.

E E 467 Antennas: Analysis and Design (4) Fundamentals of antennas, analysis, synthesis and computer-aided design, and applications in communications, remote sensing, and radars. Radiation pattern, directivity, impedance, wire antennas, arrays, numerical methods for analysis, horn antennas, microstrip antennas, and reflector antennas. Prerequisite: 1.0 in E E 361.

E E 471 Computer Design and Organization (5) Introduction to computer architecture, algorithms, hardware design for various computer subsystems, CPU control unit design, hardwired and microprogrammed control, memory organization, cache design, virtual

memory, I/O organization, and I/O hardware design. Prerequisite: either E E 271 or E E 371; CSE 143.

E E 472 Microcomputer Systems (5) Concepts of multi-level machines and computer systems organization. Utilizing microprocessors, digital computer studied at assembly- and high-language levels with emphasis on concepts of central processor architecture, memory organization, input/output and interrupts. Assembly language programming concepts applied to solution of various laboratory problems including I/O programming. Prerequisite: either E E 271 or E E 371; CSE 143.

E E 473 Linear Integrated Circuits (4) Design of linear integrated circuits applying modern MOS and BJT integrated circuit technologies: single-stage amplifiers; current-mirror DC bias and active load circuits; stability and frequency compensation of single-stage and two-stage operational amplifiers; output stages; current and voltage reference circuits. Prerequisite: 1.0 in E E 332.

E E 476 Digital Integrated Circuit Design (5) *Sechen* Comprehensive view of digital integrated circuit design. Topics to be covered include the design of inverters, static logic circuits, switch logic, and synchronous logic. Students design, simulate, and layout a complete digital IC using modern computer-aided design tools. Prerequisite: either E E 271 or E E 371; E E 331; CSE 143.

E E 477 VLSI II (5) *Sechen* Provides a fairly deep understanding of how IC-based memory and datapath blocks are designed using static and dynamic CMOS technologies. Gives students extensive experience with industry-standard computer-aided design tools, including Cadence (Virtuoso, DRC, LVS) and Avanti (Hspice). Credit not allowed for both E E 477 and E E 525. Prerequisite: E E 476.

E E 478 Design of Computer Subsystems (5) Design of digital computer subsystems and systems, using SSI, MSI, and LSI digital components. Combinational logic, sequential logic, memory hardware designs, I/O hardware and interface design, system design steps, high-speed digital circuit design, noise reduction techniques, and hardware description language. One four-hour laboratory each week and design project. Prerequisite: 1.0 in E E 331; 1.0 in E E 472.

E E 480 Microwave Engineering I (4) Analysis and design of transmission lines and matching circuits. Lossy transmission lines. Mode structures in metallic and dielectric waveguides. Microwave resonators and magnetic devices. Smith chart and matching techniques. Prerequisite: 1.0 in E E 361.

E E 481 Microwave Electronic Design (4) Design of microwave circuits using S-parameter techniques. Measurement techniques, CAD of microwave systems. Includes design, fabrication, and evaluation of a microwave amplifier. Prerequisite: 1.0 in E E 332; 1.0 in E E 361.

E E 482 Semiconductor Devices (4) Fundamentals of semiconductor theory: carrier diffusion and drift; concept of direct and indirect energy materials, effective mass of mobile carriers; device physics: homo- and heterojunctions, operating principles of bipolar, junction, and MOS field-effect transistors. Prerequisite: E E 332; E E 361.

E E 484 Sensors and Sensor Systems (4) Introduction to optical and solid-state chemical and physical sensors. Topics include transduction mechanisms, design parameters, fabrication methods and applications.

E E 486 Fundamentals of Integrated Circuit Technology (3) Processing physics, chemistry and technology, including evaporation, sputtering, epitaxial growth, diffusion, ion implantation, laser annealing, oxidation, chemical vapor deposition, photoresists. Design considerations for bipolar and MOS devices, materials and process characterization. Future trends. Prerequisite: either E E 482 or MSE 351. Offered: jointly with MSE 486.

E E 489 Integrated Circuit Laboratory (1) Hands-on experience in the building of a PMOS device, complete with oxidation, diffusion, photolithography, etching, metallization, and testing. Credit/no credit only. Prerequisite: E E 486/MSE 486, which may be taken concurrently. Offered: jointly with MSE 489.

E E 495 Electrical Engineering Design: Integrated Circuit I (4-) Engineering design process applied to integrated circuit design implemented in a design project selected by student teams. E E 496 must be taken to receive E E 495 credit. Credit not allowed for both E E 495/496 and E E 497/498. Prerequisite: E E 332; either E E 271 or E E 371.

E E 496 Robust Electrical Engineering Design: Integrated Circuit II (-4) Robust engineering design process applied to integrated circuit design implemented in a design project selected by student teams, including sensitivity analysis and definition of design specifications. Second course of a two-course sequence. Credit not allowed for both E E 495/496 and E E 497/498. Prerequisite: E E 495.

E E 497 Electrical Engineering Design: Consumer Electronics I (4-) Engineering design process applied to consumer electronics design implemented in a design project selected by student teams. E E 498 must be taken to receive E E 497 credit. Credit not allowed for both E E 495/496 and E E 497/498. Prerequisite: E E 332; either E E 271 or E E 371.

E E 498 Robust Electrical Engineering Design: Consumer Electronics II (-4) NW Robust engineering design process applied to consumer electronics design implemented in a design project selected by student teams, including sensitivity analysis and definition of design specifications. Credit not allowed for both E E 495/496 and E E 497/498. Prerequisite: E E 497.

E E 499 Special Projects (2-5, max. 10) Assigned construction or design projects carried out under the supervision of the instructor.

E E 500 Graduate Seminar (1, max. 3) Weekly seminars on current topics in electrical engineering. More than one section may be offered in a given quarter. Credit/no credit only.

E E 501 Radar Remote Sensing (3) *Sahr* General introduction to radar remote sensing of geophysical targets. Fundamentals of radar systems, range-time diagram, ambiguity function, pulse compression, spectrum estimation for underspread and overspread targets; multi-antenna correlations, interferometry, closure phases; maximum entropy source imaging; Aperture Synthesis (SAR and ISAR).

E E 502 Introduction to Microelectro Mechanical Systems (4) Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered: jointly with M E 504/ MSE 504.

E E 505 Probability and Random Processes (4) Foundations for the engineering analysis of random processes: set theoretic fundamentals, basic axioms of probability models, conditional probabilities and independence, discrete and continuous random variables, multiple random variables, sequences of random variables, limit theorems, models of stochastic processes, noise, stationarity and ergodicity, Gaussian processes, power spectral densities. Prerequisite: graduate standing and understanding of probability at the level of E E 416.

E E 506 Communication Theory I (3) *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 505 or equivalent.

E E 507 Communication Theory II (3) *Ritcey* Review of stochastic processes. Communication system models. Channel noise and capacity. Optimum detection, modulation and coding, convolutional coders and decoders. Typical channels, random and fading channels. Waveform communication, optimum filters. Prerequisite: E E 506 or equivalent.

E E 508 Stochastic Processes (3) *Ritcey* Modeling and analysis of random processes encountered in engineering applications. Stationarity and ergodicity. Harmonic analysis, power spectral densities. Karhunen-Loeve expansions. Poisson, Gaussian, and Markov processes. Stochastic integrals and differential equations. Prerequisite: E E 505 or permission of instructor.

E E 510 Mathematical Foundations of Systems Theory (4) Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with CHEM E 510/A A 510/M E 510; A.

E E 511 Introduction to Statistical Learning (4) Covers classification and estimation of vector observations, including both parametric and nonparametric approaches. Includes classification with likelihood functions and general discriminant functions, density estimation, supervised and unsupervised learning, feature reduction, model selection, and performance estimation. Prerequisite: either E E 505 or CSE 515. Offered: W.

E E 512 Graphical Models in Pattern Recognition (4) Bayesian networks, Markov random fields, factor graphs, Markov properties, standard models as graphical models, graph theory (e.g., moralization and triangulation), probabilistic inference (including Pearl's belief

propagation, Hugin, and Shafer-Shenoy), junction trees, dynamic Bayesian networks (including hidden Markov models), learning new models, models in practice. Prerequisite: E E 508; E E 511. Offered: Sp.

E E 515 Information Theory II (4) Includes advanced modern statistical coding techniques (statistical coding), advanced codes n graphs, source coding with errors (rate distortion), alternating minimization principles, channel coding with errors, network information theory, multiple description coding, and information theory in other areas including pattern recognition, bio-informatics, natural language processing, and computer science. Prerequisite: E E 514.

E E 516 Computer Speech Processing (4) *Bilmes, Kirchhoff, Ostendorf* Introduction to automatic speech processing. Overview of human speech production and perception. Fundamental theory in speech coding, synthesis and reproduction, as well as system design methodologies. Advanced topics include speaker and language identification and adaptation. Prerequisite: E E 505; E E 518.

E E 517 Statistical Language Processing (4) *Bilmes, Kirchhoff, Ostendorf* Introduction to major issues in natural language processing and human language technology, with emphasis on statistical approaches. Addresses topics in statistical parsing and tagging, dialogue systems, information extraction, and machine translation. Prerequisite: E E 505.

E E 518 Digital Signal Processing (4) *Atlas* Digital representation of analog signals. Frequency domain and Z-transforms of digital signals and systems design of digital systems; IIR and FIR filter design techniques, fast Fourier transform algorithms. Sources of error in digital systems. Analysis of noise in digital systems. Prerequisite: knowledge of Fourier analysis techniques and graduate standing, or permission of instructor.

E E 519 Stochastic Analysis of Data From Physical Systems (4) *Atlas* Computer systems for acquisition and processing of stochastic signals. Calculation of typical descriptors of such random processes as correlation functions, spectral densities, probability densities. Interpretation of statistical measurements made on a variety of physical systems (e.g., electrical, mechanical, acoustic, nuclear). Lecture plus laboratory. Prerequisite: E E 505 or equivalent.

E E 520 Spectral Analysis of Time Series (4) Estimation of spectral densities for single and multiple time series. Nonparametric estimation of spectral density, cross-spectral density, and coherency for stationary time series, real and complex spectrum techniques. Bispectrum. Digital filtering techniques. Aliasing, prewhitening. Choice of lag windows and data windows. Use of the fast Fourier transform. The parametric autoregressive spectral density estimate for single and multiple stationary time series. Spectral analysis of nonstationary random processes and for randomly sampled processes. Techniques of robust spectral analysis. Prerequisite: one of STAT 342, STAT 390, STAT 481, or IND E 315. Offered: jointly with STAT 520.

E E 521 Multidimensional Signal Processing (3) *Marks* Multidimensional (MD) signals and systems, MD sampling theorem, sample dependence in higher dimensions, MD FIR filter

design using windows and the McClellan transform, MD IIR filter stability and design. Current topics in MD signals and systems. Prerequisite: E E 442 or E E 518 or equivalent.

E E 524 Wavelets: Data Analysis, Algorithms, and Theory (3) Review of spectral analysis. Theory of continuous and discrete wavelets. Multiresolution analysis. Computation of discrete wavelet transform. Time-scale analysis. Wavelet packets. Statistical properties of wavelet signal extraction, smoothers. Estimation of wavelet variance. Offered: jointly with STAT 530; Sp.

E E 525 VLSI II (5) *Sechen* Analyzes how IC-based memory and datapath blocks are designed using static and dynamic CMOS technologies. Gives students extensive experience with industry-standard computer-aided design tools, including Cadence (Virtuoso, DRC, LVS) and Avanti (Hspice). Credit not allowed for both E E 477 and E E 525. Prerequisite: E E 476.

E E 526 VLSI III (4) *Helms, Sechen, Soma* Ultra-high speed digital logical families based on output prediction logic; high-speed division; input and output pad design; state-of-the-art latch and flip-flop design; clock distribution, including PLLs and DLLs; noise considerations in high-speed digital IC design. Prerequisite: E E 477 or E E 525.

E E 527 Solid-State Laboratory Techniques (4) *Darling* Principles and laboratory techniques used in solid-state electronics research. Basic familiarity with practices and equipment used on-campus. Laboratory safety; materials handling, storage and disposal; clean room use; photoresist characteristics; mounting, bonding, and probing; wet chemical etching; vacuum evaporation; patterning of metal films using photoresist. Extensive laboratory with limited enrollment. Prerequisite: graduate standing and permission of instructor.

E E 528 Physics and Modeling of VLSI Fabrication (4) Physics of VLSI fabrication, emphasizing processing modeling and simulation. CMOS process, sequences, point defects and diffusion, ion implantation and annealing, film growth kinetics, deposition and etching, advanced photolithography. Process interactions and process integration. Extensive use of process simulation software. Prerequisite: either E E 486/MSE 467, E E 520/M E 504/MSE 504, or E E 527. Offered: jointly with MSE 528.

E E 529 Semiconductor Optics and Optical Devices (4) *Afromowitz, Yee* Perturbations of energy states in semiconductors; direct and indirect transitions; absorption processes; optical constants; absorption spectroscopy; radiative and nonradiative transitions; processes occurring at p-n junctions; junction devices; LEDs and lasers, photovoltaics; self-electro-optic effect device; modern laser structures. Prerequisite: graduate standing or permission of instructor.

E E 531 Semiconductor Devices and Device Simulation (4) *Darling, Lauritzen, Yee* Physical principles in semiconductor devices. Generation, recombination, p-n junctions, MOS, metal-semiconductor and other interface structures. Carrier transport at low and high level injection levels. Device simulation used to demonstrate physical principles and basic device operation. Project using device simulation. Prerequisite: E E 482 or graduate standing.

E E 532 Device Modeling for Circuit Simulation (4) *Darling* Compact modeling of semiconductor devices. Analytical models,

standard SPICE models, lumped-charge models using AHDL language. Emphasis on basic diodes, MOSFET, BJTs, and other models of interest, including sensor, photonic, and power models. Compact models using AHDL language model design project. Prerequisite: E E 531 or permission of instructor.

E E 533 Photodetectors and Photodetection (4) *Afromowitz, Yee* Includes both the device physics and signal processing aspects of photodetection. Photodiodes, photoconductors, photomultipliers, and solar cells are covered. Noise, signal to noise ratios and imaging considerations are also discussed. Prerequisite: E E 482 or graduate standing.

E E 534 Power Electronics (4) Detailed study of DC-to-AC inverters, pulse-width modulated and resonant DC-to-DC converter topologies; drive and protection circuits for efficient switching of semiconductor devices. Includes extensive computer-aided circuit simulation and power supply control. Prerequisite: graduate standing.

E E 536 Design of Analog Integrated Circuits and Systems (4) *Helms, Soma* Design of analog VLSI: specifications, design, simulation, layout. Covering CMOS and Bi CMOS technologies. Prerequisite: E E 433 or equivalent and graduate standing in electrical or computer engineering, or permission of instructor.

E E 537 Computation Methods for Circuit Analysis and Simulation (3) Introduction to numerical algorithms and computer-aided techniques for the simulation of electronic circuits. Theoretical and practical aspects of important analyses: large-signal nonlinear DC, small-signal AC, nonlinear transient, and large-signal steady-state. Simulation concepts applied to the modeling and characterization of various electronic devices.

E E 538 Topics in Electronic Circuit Design (1-5, max. 5) Topics of current interest in electronic circuit and system design. Course content varies from year to year, based on current professional interests of the faculty member in charge. Prerequisite: permission of instructor.

E E 539 Advanced Topics in Solid-State Electronics (1-5, max. 5) Lectures or discussions of topics of current interest in the field of solid-state electronics for advanced graduate students having adequate preparation in solid-state theory. Subject matter may vary according to the interests of students and faculty. Prerequisite: permission of instructor.

E E 541 Automatic Layout of Integrated Circuits (4) *Sechen* Examines the algorithms behind the following commonly used physical design automation tools: floorplanning, partitioning, placement, routing, compaction, and verification. Prerequisite: E E 271 or equivalent; experience programming in either C, C++, or Java.

E E 542 Advanced Embedded Systems Design (5) *Peckol* Studies advanced embedded system design principles and practices. Emphasizes formal design methodologies such as hardware-software co-design, investigates techniques for performance optimization, and examines distributed embedded systems. Prerequisite: E E 478. Offered: A.

E E 543 Models of Robot Manipulation (3) *Hannaford* Mathematical models of arbitrary articulated robotic (or biological) arms and their application to realistic arms and tasks, including

the homogeneous coordinate model of positioning tasks, the forward and inverse kinematic models, the Jacobian Matrix, and the recursive Newton-Euler dynamic model. Prerequisite: linear algebra and graduate standing or permission of instructor.

E E 544 Advanced Robot Manipulation (4) *Hannaford, Meldrum* Continuation of the analysis of robot manipulation, considering kinematic redundancy, control of robot manipulators in contact with the environment, teleoperation, and grasping with multi-fingered hands. Students will perform a project and critique a research paper in the area of the project. Prerequisite: E E 543.

E E 545 Autonomous Multi-Robot Systems (4) Design-oriented course in autonomous multi-robot systems. Wireless peer communication protocols, multi-robot control methodologies and computational issues. Laboratory exercises include design, construction, and testing of multiple autonomous mobile robots, which compete as a team at the end of the term. Prerequisite: either E E 462 or E E 463 or graduate student standing.

E E 546 Advanced Topics in Control System Theory (1-5, max. 5) Topics of current interest in control system theory for advanced graduate students with adequate preparation in linear and nonlinear system theory. Prerequisite: permission of instructor. Offered when adequate enrollment develops prior to close of advance registration.

E E 547 Linear Systems Theory (4) Linearity, linearization, finite dimensionality, time-varying vs. time-invariant linear systems, interconnection of linear systems, functional/structural descriptions of linear systems, system zeros and invertibility, linear system stability, system norms, state transition, matrix exponentials, controllability and observability, realization theory. Prerequisite: either A A 447, E E 447 or M E 471. Offered: jointly with A A 547/M E 547.

E E 548 Linear Multivariable Control (3) Introduction to MIMO systems, successive single loop design comparison, Lyapunov stability theorem, full state feedback controller design, observer design, LQR problem statement, design, stability analysis, and tracking design. LQG design, separation principle, stability robustness. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with A A 548/M E 548.

E E 549 Estimation and System Identification (3) Fundamentals of state estimation for linear and nonlinear systems. Discrete and continuous systems. Probability and stochastic systems theory. Models with noise. Kalman-Bucy filters, extended Kalman filters, recursive estimation. Numerical issues in filter design and implementation. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or A A 548. Offered: jointly with A A 549/M E 549.

E E 550 Nonlinear Optimal Control (3) Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/M E 550.

E E 551 Power System Protection (4) *Liu* The protection of electric power systems from

overcurrents and overvoltages. Analysis and design of overcurrents resulting from faults, lightning induced or otherwise, or from excessive loads or power swings. Analysis and design of overvoltages resulting from switching transients or lightning. Principal concern is with relays and lightning arrestors as protection means. Prerequisite: E E 455 or equivalent.

E E 552 Power Systems Dynamics and Control (4) *Damborg, El-Sharkawi* Advanced computer modeling and analysis of power systems. Application of modern systems and control theories. Prerequisite: E E 351 and E E 455 or permission of instructor.

E E 553 Power System Economics (4) *Christie, Damborg, Liu* Economic structure of power systems. Problem formulation, optimization methods and programming for economic analysis of power system operation and planning. Economic dispatch, load forecasting, unit commitment, interchange, planning and reliability analysis. Provides background to pursue advanced work in planning and operation. Prerequisite: graduate standing or permission of instructor.

E E 554 Large Electric Energy Systems Analysis (4) *Christie, Liu* Deals with problems whose solution depends upon the inversion of sparse matrices that occur in the planning and operational studies of large interconnected energy systems. Application studies include system model development, state estimation, and load flow. Prerequisite: E E 456 or permission of instructor.

E E 555 Fundamentals of Intelligent Systems (4) Fundamentals and applications of intelligent systems and biologically inspired algorithms such as neural networks, evolutionary computations, swarm optimization and fuzzy systems. Solving complex engineering applications with a combination of these technologies as well as with more traditional approaches such as statistical system theories.

E E 559 Special Topics in Electrical Energy Systems (1-5, max. 5) Topics of current interest in electrical power and energy devices and systems. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

E E 562 Artificial Intelligence for Engineers (3) *Shapiro* Covers main areas of artificial intelligence (AI) without need for extensive prerequisites. Programming languages for AI; problem solving; representations; control strategies; searching strategies; predicate calculus; rule-based deduction; goal-directed planning; knowledge-based systems. Prerequisite: CSE 373 or equivalent.

E E 563 Fault-Tolerant Computing (3) *Soma* Faults and their manifestation, issues, theory, and techniques of reliable systems design, testing, design for testability, self-checking and fail-safe circuits, coding techniques, system-level fault diagnosis, fault-tolerant communication, reliable software design, and evaluation criteria. Prerequisite: basic knowledge of digital systems design or permission of instructor. Offered: jointly with CSE 563.

E E 564 Parallel Computer Systems (3) *Hwang, Kim* Pipelined and vector processors; interconnection network for parallel processing, array and associative processors; multiprocessors; data-flow machines; systolic arrays and

impact of the VLSI technology on parallel processors and processing. Prerequisite: E E 471, permission of instructor.

E E 565 Computer-Communication Networks I (4) Network architectures and protocols; layered model; reliable transmission protocols at the data control layer; Transmission Control Protocols (TCP); routing algorithms; performance modeling, and analysis of packet-switched networks. Multi-access. Projects involving routing and multi-access principles. Prerequisite: E E 505 or equivalent.

E E 566 Computer-Communication Networks II (3) Local area, metropolitan area, satellite, and packet radio networks; routing algorithms for wide area networks; optimal design of packet-switched networks; congestion and flow control; fast packet switching; gigabit networks. Prerequisite: E E 565 or permission of instructor.

E E 567 Mobile Radio Networks (3) Wireless communication networks, including digital broadcasting, wireless LAN, wireless access networks and ultra wide band (UWB); OFDM modem design; MAC and RLP; TCP/UDP over wireless; cross-layer protocol optimization; radio network planning. Prerequisite: E E 506; E E 565.

E E 568 Image Processing Computer Systems (4) *Kim* All components of digital image-processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image processing operations. Selected advanced image processing topics. Individual student project. Prerequisite: permission of instructor. Offered: jointly with BIOEN 568.

E E 571 High Frequency Circuits and Antennas: Computation of Fields and Waves (4) Planar microstrip structures are high frequency circuits and antennas used in communication, aerospace and computer industries. Examines the computation of fields and waves in such structures. How to calculate circuit parameters and radiation characteristics. Structures studied include microstrip lines, coupled lines, antennas, resonators, and discontinuities. Prerequisite: E E 482, E E 572, or equivalent.

E E 572 Electromagnetic Theory and Applications I (4) Electromagnetic waves in layered media; complex waves, leaky and slow waves, waves in periodic structures, optical fibers, ionosphere and other guiding structures; transients and dispersive media; waveguides and cavities; beam waves; eigenfunctions and eigenvalues. Prerequisite: graduate standing or permission of instructor.

E E 573 Electromagnetic Computations and Applications I (4) *Tsang* Fundamentals of computational electromagnetics, method of moments, integral equations, basis functions, iterative methods, periodic structures and Green's Functions finite difference time domain method, Yee's lattice, absorbing boundary conditions, variational principles, and finite element method. Applications in antennas, waveguides, and scattering problems. Prerequisite: E E 572 or permission of instructor.

E E 574 Electromagnetic Computations and Applications II (4) *Tsang* Current topics in computational electromagnetics, fast multipole multilevel method, sparse matrix canonical grid method, wavelet based methods, recursive method, spectral time domain method.

Applications in large scale problems such as array antennas, radar cross section, rough surface scattering, and dense media scattering. Prerequisite: E E 573 or permission of instructor.

E E 575 Waves in Random Media (4) *Tsang* Propagation and scattering of electromagnetic, optical, and acoustic waves in turbulence and random media, scattering from rough surfaces and randomly distributed particles. Atmospheric turbulence, fog, rain, smog, clear-air turbulence detection, remote sensing, terrain scattering, scattering from blood cells and tissues, scattering by ocean waves. Applications to atmospheric sciences, bioengineering, geoscience, ocean engineering. Prerequisite: graduate standing or permission of instructor.

E E 576 Computer Vision (3) Overview of computer vision, emphasizing the middle ground between image processing and artificial intelligence. Image formation, preattentive image processing, boundary and region representations, and case studies of vision architectures. Prerequisite: Solid knowledge of linear algebra, good programming skills, CSE or E E major or permission of instructor. Offered: jointly with CSE 576.

E E 577 Special Topics in Computer Vision (3) Topics vary and may include vision for graphics, probabilistic vision and learning, medical imaging, content-based image and video retrieval, robot vision, or 3D object recognition. Prerequisite: CSE/E E 576 or permission of instructor. Offered: jointly with CSE 577.

E E 578 Optimization in System Sciences (3) *Mesbahi* Covers convex sets, separation theorems, theorem of alternatives and their applications, convex analysis, convex functions, conjugation, subgradients, convex optimization, duality and applications, linear and semi-definite programming. Linear matrix inequalities, optimization algorithms, applications in system theory and control, bilinear, rank minimization, optimization software. Recommended: A A/M E/E E 547. Offered: jointly with A A/M E 578; W.

E E 579 Advanced Topics in Electromagnetics, Optics, and Acoustics (1-5, max. 5) Topics of current interest in electromagnetics, optics, and acoustics. Content varies from year to year, based on current professional interests of faculty member in charge. Prerequisite: permission of instructor.

E E 581 Digital Control (3) *Chizeck* Sampled-data systems, and z-transform. Frequency domain properties. Sampling D/A and A/D conversion. Controller design via discrete-time equivalents, direct methods, state feedback and observers. Quantization effects. LQR control and introduction to LQG optimal control. Prerequisite: either E E/A A/ or M E 548. Offered: jointly with A A/M E 581; W.

E E 582 Introduction to Discrete Event Systems (3) *Berg* Modeling DES with automata and Petri nets. Languages. State estimation and diagnostics. Control specifications. Feedback control. Dealing with uncontrollability and unobservability. Dealing with blocking. Timed automata and Petri nets. Prerequisite: A A 447/E E 447/ M E 471. Offered: jointly with A A 582/M E 582; even years; Sp.

E E 583 Nonlinear Control Systems (3) Analysis of nonlinear systems and nonlinear control system design. Phase plane analysis. Lyapunov stability analysis. Describing functions.

Feedback linearization. Introduction to variable structure control. Prerequisite: A A/E E 447/M E 471. Offered: jointly with M E/A A 583; odd years; Sp.

E E 585 System Identification and Adaptive Control (3) Theory and methods of system identification and adaptive control. Identification of linear-in-parameter systems, using recursive LS and extended LS methods; model order selection. Indirect and direct adaptive control. Controller synthesis, transient and stability properties. Prerequisite: either E E 505 or AMATH 506 or STAT 506; E E 548/A A 548/M E 548. Offered: jointly with M E 585/A A 585.

E E 586 Digital Video Coding Systems (4) *Sun* Introduction to digital video coding algorithms and systems. Theoretical and practical aspects of important topics on digital video coding algorithms, motion estimation, video coding standards, systems issues, and visual communications. Prerequisite: graduate standing or permission of instructor.

E E 587 Multimedia Compression and Networking (4) *Hwang* Addresses four major components of multimedia: 1) data compression of multimedia (e.g., speech, audio, image, and video); 2) quality of service (QoS) issues for data transmission over IP; 3) multimedia streaming and conferencing applications; and 4) intellectual property management and protection (IPMP) of multimedia contents. Co-requisite: E E 518.

E E 589 Advanced Topics in Sensors and Sensor Systems (3) Topics of current interest in sensors and sensor systems. Prerequisite: permission of instructor.

E E 590 Advanced Topics in Digital Computers (2-5, max. 15) Lectures or discussions of topics of current interest in the field of digital systems. Subject matter may vary from year to year. Prerequisite: permission of instructor.

E E 591 Robotics and Control Systems Colloquium (1, max. 3) Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A A/CHEM E/M E 591.

E E 592 Electrical Engineering Research Survey (1) Weekly presentations on current research activities by members of the department. Credit/no credit only.

E E 593 Feedforward Control (3) *Devasia* Design feedforward controllers for precision output tracking; inversion-based control of non-minimum-phase systems; effect of plant uncertainty on feedforward control; design of feedforward controllers for applications such as vertical take off and landing aircraft, flexible structures and piezo-actuators. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with A A/M E 593.

E E 594 Robust Control (3) Basic foundations of linear analysis and control theory, model realization and reduction, balanced realization and truncation, stabilization problem, coprime factorizations, Youla parameterization, matrix inequalities, H-infinity and H2 control, KYP lemma, uncertain systems, robust H2, integral quadratic constraints, linear parameter varying synthesis, applications of robust control. Offered: jointly with A A 594/M E 594; odd years; Sp.

E E 595 Advanced Topics in Communication Theory (1-5, max. 5) Extension of 507, 508, 518, 519, 520. Material differs each year, covering such topics as: detection theory, decision theory, game theory, adaptive communication systems, nonlinear random processes. Prerequisite: permission of instructor.

E E 596 Advanced Topics in Signal and Image Processing (2-5, max. 5) Topics of current interest in signal and image processing. Content may vary from offering to offering. Prerequisite: permission of instructor.

E E 599 Selected Topics in Electrical Engineering (*) Prerequisite: permission of instructor.

E E 600 Independent Study or Research (*) .

E E 700 Master's Thesis (*) .

E E 800 Doctoral Dissertation (*).

Engineering

ENGR 100 Introduction to Engineering Design (5) I&S Introduction to design and communication principles through engineering project approach, stressing teamwork, design process, specialties and tools of engineering, creative and analytical thinking, professionalism and ethics, social, economic and political context, open-ended problems. Grading based on quality of engineering projects and presentation of design through written, oral, and graphical communication. Offered: AWSp.

ENGR 101 Technology and Society (5) I&S Examines revolutionary technologies and how they have shaped the world. Investigates how railroads, computers, automobiles, airplanes, the Internet, nanotechnology, and other innovations affect everyday life. Includes examination of how geographers, philosophers, scientists, artists, engineers, and others are involved in creation, implementation, and criticism of technology.

ENGR 197 Engineering Problem Solving (1, max. 12) Lectures and problem sessions in mathematics, chemistry, and physics with engineering applications. Enrollment restricted to Minority Science, Engineering Program (MSEP), and Women in Science and Engineering (WiSE) students. Credit/no credit only. Offered: AWSp.

ENGR 199 Special Projects (1-3, max. 3) Students propose problems to solve to an engineering faculty member. The problems may be selected from the student's own experiences and interests, from the interest of the faculty member, or from other sources such as faculty or graduate students doing research projects, or from personnel in the physical medicine area, occupational therapy, hospital, industry, government. Corroboration by an engineering faculty member is required. Project suggestions are available. Offered: AWSpS.

ENGR 202 Special Projects (1-3, max. 3) Projects on topics of current interest in engineering. Offered: A.

ENGR 321 Engineering Cooperative Education ([1-2]-, max. 16) Engineering practicum; integration of classroom theory with on-the-job training. Periods of full-time work alternate with periods of full-time study. Open only to students who have been admitted to the Engineering Cooperative Education Program.

Requires subsequent completion of ENGR 322 to obtain credit. Credit/no credit only. Offered: AWSpS.

ENGR 322 Engineering Cooperative Education Postwork Seminar (-0) Reporting and evaluation of co-op work experience, and discussion of current topics in engineering. To be taken during the first quarter in school following each work session. Offered: AWSpS.

ENGR 360 Introductory Acoustics (3) NW Introduction to propagation of acoustical waves; emphasis on propagation of sound waves in air, but material is applicable to propagation of sound waves in liquids, including underwater acoustics, and to propagation of stress waves in solids. Includes a historical development of acoustics, terminology, and units employed. Prerequisite: either MATH 136 or MATH 307; PHYS 123. Offered: Sp.

ENGR 498 Special Topics in Engineering (1-5, max. 6) Offered: AWSpS.

ENGR 499 Special Projects in Engineering (1-3, max. 6) Offered: AWSpS.

ENGR 598 Seminar Series in Engineering (1, max. 12) *Kalonji, Reed* Graduate seminar series on topics of interest to all engineering students.

Industrial Engineering

IND E 101 Introduction to Industrial Engineering (1) I&S Examines the basic concepts and methods of industrial engineering through team-based hands-on activities. Explores the profession of industrial engineering. Discusses resources available to Industrial Engineering students at the University of Washington. Offered: Sp.

IND E 250 Fundamentals of Engineering Economy (4) NW Basics of industrial cost analysis and accounting. Application of interest computations to engineering decision making. Analysis of engineering alternatives based on use of interest computations, valuations, depreciation, and cost estimates. Offered: AWSp.

IND E 295 Product Dissection (3) *Jorgensen, Kumar* Examination of the way products and machines work, their physical operation, the manner in which they are constructed, and the interaction between design, materials, and manufacture. Laboratories involve dissection and assembly of several common industrial and consumer products by student teams. Offered: jointly with M E 295.

IND E 310 Linear and Network Programming (4) *Zabinsky* Modeling and optimization of linear network problems. Topics include: optimization of linear systems, mathematical model design, simplex method, primal-dual algorithms, parametric programming, goal programming, network problems and algorithms, and PERT/CPM. Prerequisite: either MATH 136 or MATH 308; CSE 142. Offered: 'A.

IND E 311 Stochastic Models and Decision Analysis (4) *Zabinsky* Stochastic systems analysis to industrial engineering problems. Topics include: Markov chains, queueing theory, queueing applications, and decision analysis. Prerequisite: IND E 315; IND E 310. Offered: W.

IND E 312 Methodology of Operations Research (4) *Zabinsky* Modeling and optimiza-

tion of problems and dynamic programming approach to optimization. Topics include: integer programming formulation techniques, linear and Lagrangian relaxation, branch-and-bound and cutting-plane methods, integer programming applications, and dynamic programming. Prerequisite: IND E 311. Offered: Sp.

IND E 315 Probability and Statistics for Engineers (3) NW Application of probability theory and statistics to engineering problems, distribution theory and discussion of particular distributions of interest in engineering, statistical estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, and analysis of engineering data sets. Prerequisite: either MATH 136 or MATH 307. Offered: AWSpS.

IND E 316 Design of Experiments and Regression Analysis (4) NW *Kapur* Introduction to the analysis of data from planned experiments. Analysis of variance for multiple factors and applications of orthogonal arrays and linear graphs for fractional factorial designs to product and process design optimization. Regression analysis with applications in engineering. Prerequisite: IND E 315. Offered: jointly with STAT 316.

IND E 321 Statistical Quality Control (4) *Kapur, Storch* Design of quality control and assurance systems. Statistical Process Control (SPC) design and implementation. Control charts for attributes and variables. Process capability analysis and process improvement techniques. Statistical tolerance design. Quality management and recent developments. Prerequisite: IND E 315. Offered: A.

IND E 337 Introduction to Manufacturing Systems (4) *Storch* Description of manufacturing systems. Includes discussion of current trends in manufacturing. Introduces process flow analysis, manufacturing organizations including job-shop, assembly lines, and group technology, manufacturing inventory philosophies (just-in-time, MRP, OPT), work environment, and work simplification. .

IND E 351 Human Factors in Design (4) Engineering considerations of the abilities and limitations of the human aspect in the design of operational systems and components. Functional, psychological, physiological, and environmental considerations.

IND E 424 Simulation (4) *Beamon* Discrete-event simulation methodology emphasizing model formulation and construction with modern simulation languages and environments, statistical basis for evaluating model results, design and management of simulation projects. Application to manufacturing, retail, and service industries. Prerequisite: IND E 337, which may be taken concurrently; IND E 311. Offered: W.

IND E 426 Reliability Engineering and System Safety (4) *Kapur* Reliability and system safety measures. Life distributions and their applications in reliability. System reliability models. Design by reliability and probabilistic design. Reliability and safety analysis through FMECA and FTA. Reliability estimation and measurement by testing for binomial, exponential, and Weibull distributions. Prerequisite: IND E 315. Offered: Sp.

IND E 430 Manufacturing Scheduling and Inventory (4) *Beamon, Storch* Manufacturing scheduling and inventory control for different

work organizations. Coverage of workforce scheduling, job- and flow-shop scheduling and order release, production line balancing, MRP II, Lean Production, and data management. Particular attention to computer-based aspects of management and scheduling for manufacturing and service industries. Prerequisite: IND E 337; IND E 311.

IND E 431 Computer Integrated Manufacturing (4) Design and control of computer-based production systems. Focus on selection and integration of flexible manufacturing technology, computer hardware, application and operating system software, data communication networks, data management systems. Laboratory assignments concentrate on programming and integration of system components. Current literature and recommended texts used as reference sources. Prerequisite: IND E 337; CSE 142.

IND E 433 Introduction to Computational Manufacturing (4) *Woo* Fundamentals in computer aided design/manufacturing. Visualization, 3-D wireframes, curves and surfaces, solid modeling. Numerical control machining, robotics, and assembly. Prerequisite: IND E 337; IND E 310. Offered: W.

IND E 439 Plant Layout and Material Handling (4) *Beamon, Storch* Design of new or expanding industrial facilities. Consideration of work organization and layout. Study of basic design of plant systems, including plumbing, electrical, HVAC, illumination, acoustics, and waste handling. In depth coverage of material handling system design and equipment choices. Prerequisite: IND E 310.

IND E 455 User Interface Design (4) *Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Offered: jointly with T C 455; A.

IND E 494 Design in the Manufacturing Firm (4) Engineering design in manufacturing firms is presented. Topics include design methodology, concurrent engineering, and project management. Focus on the relationship between product design and manufacturing (design for production and assembly). Prerequisite: IND E 337; T C 333. Offered: W.

IND E 495 Industrial Engineering Design (4) Capstone senior design project involving identification and synthesis of industrial engineering skills. Students apply their knowledge of industrial engineering to actual industrial problems. Prerequisite: IND E 494; IND E 351. Offered: Sp.

IND E 496 Technology-Based Entrepreneurship (3) Concentrates on hands-on aspects of innovation and entrepreneurial enterprise development. Examines relationships between innovation, iterative prototyping, and marketing testing. Students identify market opportunities, create new technology-based products and services to satisfy customer needs, and construct and test prototypes. Prerequisite: IND E 250. Offered: jointly with M E 496.

IND E 498 Special Topics in Industrial Engineering (1-5, max. 9) Lecture and/or laboratory.

IND E 499 Special Projects (2-5, max. 9) .

IND E 513 Linear Optimization Models in Engineering (3) *Zabinsky* Advanced formulation techniques to expand applications of linear programming to large-scale models. Appreciation of role of optimization models in engineering applications through introduction of techniques such as decomposition. Individual engineering projects. Prerequisite: IND E 310 and MATH 308 or permission of instructor.

IND E 515 Fundamentals of Optimization (5) Maximization and minimization of functions of finitely many variables subject to constraints. Basic problem types and examples of applications; linear, convex, smooth, and nonsmooth programming. Optimality conditions. Saddlepoints and dual problems. Penalties, decomposition. Overview of computational approaches. Prerequisite: linear algebra and advanced calculus. Offered: jointly with AMATH 515/MATH 515.

IND E 516 Applications of Optimization in Engineering Design (3) *Zabinsky* Discussion of issues arising in applications of optimization to engineering design. Emphasis on formulating problems and selecting appropriate solution techniques. Random search methods for problems otherwise computationally intractable. Individual projects in engineering optimal design. Prerequisite: AMATH/MATH/IND E 515 and MATH 328 or permission of instructor. Offered: jointly with AMATH 510.

IND E 518 Seminars on Advances in Manufacturing and Management (1) *Mescher, Ramulu, Woo* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management. Offered: jointly with M E 518 AWSp.

IND E 521 Quality Control in Manufacturing (3) *Kapur, Storch* Design of quality control systems in manufacturing. Use of advanced statistical process controls, sampling inspection techniques, process capability, and other statistical tools. Also includes vendor sourcing and control tools, methods for establishing specifications and tolerances, quality function deployment, and other quality control techniques. Prerequisite: graduate standing.

IND E 524 Robust Design and Quality Engineering (3) *Kapur* Introduction to robust design and quality engineering. Applications of design of experiments for product and process design optimization. Experimental design using orthogonal arrays and linear graphs. System models using Chebyshev's orthogonal polynomials. Robustness in design and quality improvement for complex systems including Taguchi methods for quality engineering. Prerequisite: IND E 316 or equivalent.

IND E 526 Reliability in Product Design and Testing (3) *Kapur* Product assurance including reliability and quality engineering. Reliability design, measurement, and optimization. Advanced topics in probabilistic design. Design of reliability test plans and analysis of test data. Design of reliability programs and their management. Prerequisite: graduate standing.

IND E 531 Computer Integrated Manufacturing (3) Design and analysis of advanced manufacturing systems from a strategic as well as technological perspective. Focus on information

generation, management, and coordination aspects of complex manufacturing organizations. Examination of system integration alternatives and consequences for relationships with customers and suppliers. Prerequisite: IND E 431 or equivalent. Offered: jointly with M E 505.

IND E 532 Geometric Modeling (3) *Woo* Mathematics and computations in geometric modeling of three-dimensional objects. Parametric representation of curves and surfaces. Topology for data structure design. Visibility for line-of-sight computations.

IND E 533 Computational Methods in Design and Manufacturing (3) *Woo* Sampling size and accuracy: uniform, random, and Hammersley. Approximation of curves and surfaces. Optimization: minima and maxima. Search and gradient techniques. Line integral for geodesic and optimal path. Offered: jointly with M E 507.

IND E 535 Engineering Simulation (3) *Beamon* Advanced applications of discrete event, continuous, and combined discrete-continuous simulation modeling, detailed examination of fundamental computer programming concepts underlying the design and development of simulation languages, variance reduction techniques, and output analysis for various engineering, service systems, and manufacturing applications. Prerequisite: IND E 424 or equivalent.

IND E 537 Introduction to Manufacturing Systems (3) *Storch* Description of manufacturing systems. Includes discussion of current trends in manufacturing, especially lean principles. Introduces process flow analysis, manufacturing organizations including job-shop, assembly lines, and group technology, manufacturing inventory philosophies (just-in-time, MRP, OPT), work environment, and work simplification. Offered: jointly with ENV H 537; A.

IND E 538 Large Assembly Manufacturing Systems (3) *Storch* Presents principles of group technology, zone construction, product-oriented work breakdown structure. Application to shipbuilding, aircraft, rail-car, and truck manufacture. Techniques of production planning, scheduling and control, organization, and plant layout, as well as the role of the computer, are studied in detail. Prerequisite: graduate standing.

IND E 543 Virtual Interface Technology (1/3, max. 3) *Furness* Explores advanced concepts and technologies for interfacing humans to complex machines, with focus on virtual interfaces. Interface design principles reviewed from psychological and technological perspectives. Hardware, software, and mindware aspects of virtual interfaces investigated. Applications postulated and designed. Prerequisite: graduate standing in College of Engineering or permission of instructor.

IND E 544 Virtual World Development (3) *Furness* Software implementation, physiological and cognitive constraints, and the mathematics and philosophy of inclusion. Development of software tools, editing and interaction techniques, disposition of virtual world entities, nature of space, situated knowledge, divergent models for multiple participants, experiential mathematics, cyberspace. Cultural, legal, moral, ethical issues. Prerequisite: IND E 543 or permission of instructor.

IND E 545 User-Centered Design (4) *Turns* Explores the user-centered design paradigm

from a broad perspective, emphasizing how user research and prototype assessment can be integrated into different phases of the design process. Students learn to think like a user-centered designer and carry out activities that are key to user-centered design. Offered: jointly with T C 518.

IND E 551 Elements of Dynamic Enterprise Modeling (3) Introduces practical techniques for modeling, analyzing, and implementing real-time enterprise control systems in application area such as manufacturing, supply chain flow control, and logistics decision schemas. Uses basic mathematical tools supported with a symbolic algebra software tool. Requires basic computer skills. Offered: A.

IND E 552 Introduction to Real-Time Enterprise Control (3) Provides students with principles, designs, techniques and algorithms for synthesizing real-time control of enterprise processes, using hybrid systems theory. Application areas include supply chain flow control, logistics decision schemas, transportation systems, dynamic reconciliation procedures, minimum cost production, and maximum profit price/ordering strategies. Prerequisite: IND E 551, or permission of instructor. Offered: W.

IND E 553 Modeling and Automation of Enterprise Processes (3) Third course in a three-course sequence. Provides architecture, algorithms and procedures for designing and implementing enterprise control policies for automating and enhancing enterprise functionality. Emphasis on hybrid system theories. Prerequisite: IND E 552, or permission of instructor. Offered: Sp.

IND E 564 Recognition of Health and Safety Problems in Industry (4) Develops skills in occupational health and safety hazard recognition in a variety of important northwest industries. Focuses on process understanding and hazard recognition skills during walk-through inspections of several local facilities, stressing a multidisciplinary approach. Offered: jointly with ENV H 564.

IND E 566 Introduction to Ergonomics (3) Basic principles of ergonomics in work environment applied to problems of worker and management. Topics include measurement of physical work capacity, problems of fatigue and heat stress, applied biomechanics, worker-machine interactions and communication, design of displays and controls. Prerequisite: basic human physiology or permission of instructor. Offered: jointly with ENV H 566/NSG 508; odd years; Sp.

IND E 567 Applied Occupational Health and Safety (3) *Camp, Johnson* Application of occupational safety and health principles. Student teams perform evaluations, assess production methods/processes and exposures, health and safety procedures and programs, and develop engineering and administrative controls. Students perform on a consulting project with a local company including budgeting, project reporting, and presentation. Offered jointly with ENV H 559 and NSG 505. Offered: Sp.

IND E 570 Supply Chain Systems (3) *Beamon* Develops concepts related to the design, evaluation, and performance of supply chain systems through an exploration of contemporary practice and research, focusing on current issues, analytical frameworks, and case studies. Prerequisite: IND E 315 or equivalent.

IND E 591 Seminar (1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E 592 Seminar (1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E 593 Seminar (-1) Credit/no credit only. Topics of current interest in industrial engineering. Prerequisite: graduate standing in Industrial Engineering or permission of instructor.

IND E 599 Special Topics in Industrial Engineering (1-5, max. 9) Prerequisite: permission of supervisor.

IND E 600 Independent Study or Research (*) .

IND E 700 Master's Thesis (*) .

IND E 800 Doctoral Dissertation (*)

Materials Science and Engineering

MSE 170 Fundamentals of Materials Science (4) NW Fundamental principles of structure and properties of materials utilized in practice of engineering. Properties of materials are related to atomic, molecular, crystalline structure. Metals, ceramics, multiphase systems, and polymeric materials. Relationships between structure and electrical, mechanical, thermal, chemical properties. For advanced freshmen and sophomores. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155. Offered: AWSpS.

MSE 298 Introduction to Modern Materials (1) Materials and advances in materials are at the core of a large number of significant technological advances. Seminar format highlights processing, properties, and uses of a broad class of materials for a variety of applications, each introduced by a faculty member from the department.

MSE 310 Introduction to Materials Science and Engineering (2) Introduces the materials field to new department majors. Examples are drawn from ceramics, metals, polymers, electronic materials and composites. Structure-properties-manufacturing-design relationships are emphasized. Materials selection design project. Introduction to research. Offered: A.

MSE 311 Integrated Junior Laboratory I (2) Laboratory experimental techniques including writing, literature search, research planning and computer applications. Optical microscopy experiments, sample preparations, X-ray equipment, and X-ray diffraction analysis of materials. Offered: A.

MSE 312 Integrated Junior Laboratory II (2) Materials processing related laboratory experiments, including powder synthesis, redox reactions of particulate materials, grain growth, recrystallization, phase transformation, green tape processing, particle interaction and rheology, slip and tape casting and dry processing, sol-gel processing, polymer processing, sintering behavior, metal welding, and heat treatment. Offered: W.

MSE 313 Integrated Junior Laboratory III (2) Kinetics and phase transformation related laboratory experiments, including solidification.

Mechanical properties related laboratory experiments, including stress-strain behavior of materials and elastic modulus of materials, effect of work hardening on stress strain behavior, and effect of surface condition of the strength of glass. Offered: Sp.

MSE 321 Thermodynamics and Phase Equilibrium (4) Phase equilibria in materials systems of one, two and three components. Determination of phase diagrams. Quantitative applications of thermodynamics to systems of interest to materials scientists; detained review of thermodynamic laws and principles. Offered: A.

MSE 322 Kinetics and Microstructural Evolution (4) Applications of thermodynamic and kinetic principles to the study of transport processes, transformations and reactions in engineering materials. Thermal activation and rates of processes, nucleation and growth, phase transformations, grain growth, sintering, among other processes. Prerequisite: MSE 321. Offered: W.

MSE 331 Crystallography and Structure (3) Theory and practice of x-ray diffraction with applications to materials sitemaps. Principles of crystal symmetry, lattice systems, and stereographic projections. Bragg's law of diffraction, Laue conditions, diffraction by X-rays, single crystal and powder diffraction techniques and their applications to lattice, phase, strain, and texture analyses. Prerequisite MSE 170. Offered: A.

MSE 333 Materials Characterization (3) Principles and applications of analytical techniques, imaging, diffraction and spectroscopy for materials characterization including crystal structures, texture formation, phase analysis. Nano- and micro-structures of materials including defects and second phases, chemistry, bonding, compositions of materials. Demonstrations and lab experiments involving light scattering and diffraction techniques. Prerequisite: MSE 170; MSE 331. Offered: S.

MSE 342 Materials Processing I (3) Provides students with the fundamentals and applications of metal and alloy processing techniques. Focuses on relationships between the processing fundamentals and practice, and between processing, microstructure, and properties. Ferrous and non-ferrous metal and alloy processing are discussed. Prerequisite: MSE 170; MSE 322. Offered: W.

MSE 351 Electron Theory of Engineering Materials (3) Introduction to elementary solid-state concepts in materials, free electrons, and band theories. Principles to conduction in metals, insulators, semiconductors, and applications of semiconductors and devices. Prerequisite: MSE, 170, MSE 331. Offered: W.

MSE 352 Functional Properties of Materials I (3) Introduction to thermal properties, electrical (ionic and polaron) conduction and optical properties, including origins of color, interaction of light wave with materials, lasers and optoelectronics. Focuses on the relations between physical properties and chemical composition, crystal structure and microstructure. Prerequisite: MSE 351. Offered: S.

MSE 362 Mechanical Behavior of Materials I (3) Influence of structure on the mechanical properties materials. Definition of different mechanical properties and experimental techniques to measure them. Elastic, viscoelastic and plastic deformation. Introduction to fracture. Prerequisite: MSE 170. Offered: Sp.

MSE 421 Case Studies in Thermodynamics (3)

Applications of thermodynamics to the steady state. Statistical interpretation of entropy. Heterogeneous equilibria. Thermodynamics of solutions. Defects in solids and thermodynamics of surfaces. Prerequisite: MSE 321, MSE 322. Offered: A.

MSE 431 Physical Materials Principles (3)

Principles of relationships between processing, properties and structure of materials with emphasis on microstructures, phase compositions and physical properties of materials systems, including ceramics, metals, polymers, composites, compound semiconductors, magnetic systems, and biological hard tissues. Prerequisite: MSE 310; MSE 331; MSE 342; MSE 362. Offered: A.

MSE 442 Materials Processing II (3)

Develops a basic understanding of both engineering and science aspects of ceramic processing. Fundamentals of powder processing and characterization, green body formation, sintering, microstructural development and properties. Prerequisite: MSE 342. Offered: A.

MSE 443 Extractive Process Analysis (3)

Extractive processes analyzed by the methods of material and energy balances, computational thermodynamics, process kinetics and reactor theory. Introduction to process optimization. Prerequisite: MSE 321. Offered: S.

MSE 452 Functional Properties of Materials II (4)

Dielectric materials including ferroelectrics, piezoelectrics and pyroelectrics, magnetic properties, high temperature superconductivity, shape memory materials. Detailed discussion on relations of these properties with atomic and crystal structures, and applications. Prerequisite: MSE 351, MSE 352. Offered: W.

MSE 462 Mechanical Behavior of Materials II (4)

Influence of structure on the mechanical properties of materials. Stress-strain tensors and response of materials to multiaxial loads. Effect of symmetry on elastic properties; spring dashpot analogs for viscoelasticity; strengthening mechanisms and continuum plasticity; failure probability and toughening mechanisms; creep, fatigue and stress corrosion cracking. Prerequisite: MSE 362. Offered: W.

MSE 463 Corrosion and Wear of Materials (4)

Mechanisms of corrosion, thermodynamics, kinetics of corrosion. Passivity; Pourbaix diagrams; corrosion rate testing and measurements; forms of corrosion; effects of alloy and environmental variables; corrosion testing. Wear mechanisms: adhesive, abrasive, erosive. Fretting; surface roughness, wear testing. Coatings for corrosion and wear protection. Offered: S.

MSE 471 Introduction to Polymer Science and Engineering (3)

Introduction of preparative methods of polymers; physical chemistry of polymeric molecules in solution, liquid and solid phase; thermodynamics of polymers; methods of characterization; mechanical properties; fabrication techniques; properties of commercial polymers. Recommended: one quarter of physical chemistry and one quarter of organic chemistry. Offered: A.

MSE 473 Noncrystalline State (4)

Chemistry and physics of inorganic glass and amorphous semiconductors; structure, properties, and processing of vitreous materials. Prerequisite: MSE 170; MSE 321; MSE 331. Offered: S.

MSE 475 Introduction to Composite Materials (4)

Microstructural design and processing of composite materials; polymeric, metallic, and ceramic matrices; fibers and fiber-reinforced composites, thermal, mechanical, and electrical properties. Recommended: basic background in materials science and engineering (level of MSE 170), mechanics of materials (level of CEE 220), and linear algebra and familiarity with matrix operations (level of MATH 308 or 318). Offered: A.

MSE 477 High Temperature Materials (4)

Chemical and mineralogical composition; processing methods; thermal, physical, and chemical properties and tests; application in high-temperature processes. Prerequisite: MSE 310, MSE 321.

MSE 481 Science and Technology of Nanostructures (3)

Comprehensive introduction to the developing field of nanoscience and nanotechnology. Includes materials properties as a function of length-scale and dimensionality, applications in medicine/biology, electronics, magnetism, and electro-mechanical systems. Cooperative learning approaches involving student participation with team assignments, class activities, lectures, and laboratory visits. Offered: W.

MSE 484 Materials Chemistry (3) NW

Overview of basic principles, techniques, and applications associated with solid materials. Topics include description of crystals, examples of crystal structures, structural analysis, band structures of solid materials, preparation of materials, materials for microelectronics, and materials for information technology. Prerequisite: CHEM 453 or CHEM 455. Offered: jointly with CHEM 484; Sp.

MSE 485 Introduction to Electronic Packaging and Materials (3)

The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermomechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with M E 485; A.

MSE 486 Fundamentals of Integrated Circuit Technology (3)

Processing physics, chemistry and technology, including evaporation, sputtering, epitaxial growth, diffusion, ion implantation, laser annealing, oxidation, chemical vapor deposition, photoresists. Design considerations for bipolar and MOS devices, materials and process characterization. Future trends. Prerequisite: either E E 482 or MSE 351. Offered: jointly with E E 486; W.

MSE 487 Laboratory in Electronic Packaging and Materials (1)

Laboratory course to accompany M E 485 Experiments related to design, processing and reliability of electronic packaging used in consumer electronics. Corequisite: MSE 485. Offered: jointly with M E 487; A.

MSE 489 Integrated Circuit Laboratory (1)

Hands-on experience in the building of a PMOS device, complete with oxidation, diffusion, photolithography, etching, metallization, and testing. Prerequisite: E E 486/MSE 486, which may be taken concurrently. Offered: jointly with E E 489; W.

MSE 491 Materials Design and Failure (1)

Develop understanding of mechanical design of all engineering materials (metals, ceramics, polymers, glasses, elastomers, composites); classes of engineering materials; materials, process selection, optimization for engineering applications; statistical quality control principles; common mechanical failure mechanisms; lab experiments and term projects involving design, hands-on processing, failure analysis. Offered: W.

MSE 492 Design in Materials Engineering II (3)

Materials engineering design criteria including: materials selection, process design, and manufacturability issues; statistical methods and quality control concepts for engineering design; engineering economics for safety. Primary focus is on the completion of the two-quarter team design project on materials engineering. Prerequisite: MSE 491. Offered: Sp.

MSE 497 Undergraduate Research (1-5, max. 12)

Research in materials under faculty supervision other than the MSE senior project. Cannot be used toward the technical elective requirements in the MSE major. Credit/no credit only.

MSE 498 Special Topics (1-5, max. 8)

Special topics in materials science and engineering offered as a course with lectures, conferences, or laboratory. Offered: AWSpS.

MSE 499 Special Project (*-, max. 5)

Materials science and engineering field or laboratory investigations in group or individual setting. Written report required. Offered: AWSpS.

MSE 501 Advanced Processing of Inorganic Materials (3)

Discusses advanced processes of inorganic materials including metals, ceramics and electronic materials, such as high temperature processing, sintering, solidification, single crystal growth from liquid, and vapor phase deposition. Emphasizes both the fundamentals and practical approaches of these processing techniques. Offered: even years; A.

MSE 502 Sol-Gel Processing (3)

Fundamentals of colloid science and the physics and chemistry of the sol-gel process. Emphasizes the synthesis and applications of various materials, such as multi-component oxides, nano-composites, meso- and microporous materials, organic/inorganic hybrids, and biomaterials that have important applications in both leading technologies and modern industries. Offered: odd years; A.

MSE 504 Introduction to Microelectro Mechanical Systems (4)

Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered: jointly with E E 502/M E 504; A.

MSE 510 Bonding, Crystallography, and Symmetry-Related Properties of Materials (3)

Rigorous introduction to the fundamentals of bonding, symmetry, crystallography, and related properties. Quantum mechanical foundation of cohesion and properties of solids. Geometric approach to understanding symmetry elements in 2-D and 3-D, including point groups, space groups, stereographic projections, and bravais

lattices. Tensor properties of crystals related to crystallography and symmetry. Offered: A.

MSE 512 Experimental Transmission Electron Microscopy (3) Fundamentals of electron optics as applied to microscopy; applications of contrast theories and electron diffraction with emphasis on defects and multiphase structures in crystalline solids. Prerequisite: MSE 510. Offered: W.

MSE 513 Transmission Electron Microscopy Laboratory (2) One four-hour laboratory and one two-hour discussion/demonstration per week; metallic, ceramic, electronic biological sample preparation techniques; diffraction, imaging, and spectroscopy techniques in electron microscopy. Prerequisite: MSE 512 which may be taken concurrently. Offered: W.

MSE 515 Advanced Transmission Electron Microscopy (3) Principles of image formation in crystalline and amorphous materials at the atomic resolution level; high spatial resolution electron diffraction with emphasis on convergent beam electron diffraction; quantitative elemental compositional and chemical analysis with energy dispersive x-ray spectroscopy and electron energy loss spectroscopy; high voltage electron microscopy. Prerequisite: MSE 512 and MSE 513. Offered: odd years; Sp.

MSE 518 Advanced Mineralogy (3) Crystal symmetry; point groups, space groups. Mathematical description of crystal structures; group theory and irreducible representations; tensor description of physical properties; stress, strain, piezoelectricity, elasticity; structural and magnetic phase transition, Landau theory, deformation and creep in crystals; elasto-viscous properties of Earth's mantle, crystal chemistry and solid state reactions. Offered: jointly with ESS 537; Sp.

MSE 520 Seminar (1, max. 6) Review of research problems in recent literature. Registration required for all graduate students. Credit/no credit only. Offered: AWPSP.

MSE 524 Applied Rate Phenomena (3) Introduction to rate theory and transport processes. The principal thrust is on applications in ceramics and metallurgy. Prerequisite: basic course in transport phenomena or permission of instructor. Offered: W.

MSE 525 Kinetics and Phase Transformations (3) Thermodynamic basis for kinetic processes, including diffusion and phase transformation kinetics. Diffusion problems and solution methodologies, statistical treatment of diffusion, solid-liquid and solid-solid transformations, ordering transitions. Special topics related to grain growth, sintering, martensitic transformations. Prerequisite: MSE 322 and MSE 421 or equivalent. Offered: Sp.

MSE 528 Physics and Modeling of VLSI Fabrication (4) Physics of VLSI fabrication, emphasizing processing modeling and simulation. CMOS process, sequences, point defects and diffusion, ion implantation and annealing, film growth kinetics, deposition and etching, advanced photolithography. Process interactions and process integration. Extensive use of process simulation software. Prerequisite: either E E 486/MSE 467, E E 520/M E 504/MSE 504, or E E 527. Offered: jointly with E E 528.

MSE 530 Fundamentals and Applications of Metal Finishing (3) Fundamentals and applications of corrosion to the finishing and

processing of metals. Corrosion, electrochemical fundamentals, materials cleaning processes, electrodeposition, surface treatments, finishing processes. Offered: odd years; A.

MSE 541 Defects in Materials (3) Detailed study of the general properties and effects of point, line, and planar defects in crystalline solids. Prerequisite: MSE 331 or equivalent. Offered: W.

MSE 544 Mechanical Behavior of Materials (3) Mechanical properties of metals, ceramics, and polymers. Elasticity and viscoelasticity. Macroscopic and microscopic aspects of deformation and fracture. Continuum plasticity and microscopic hardening mechanisms. High temperature deformation. Fracture mechanics, brittle and ductile fracture. Deformation and fracture mechanics maps. Prerequisite: MSE 510 and MSE 541 or permission of instructor.

MSE 550 Magnetism, Magnetic Materials, and Related Technologies (3) A comprehensive introduction to magnetism, magnetic materials, and related applications. Discusses intrinsic and phenomenological concepts of magnetism, ordered magnetic materials (emphasizing their structure-sensitive properties), magnetic phenomena, small particles/thin films, and applications (magnetic recording, permanent magnets, quantitative imaging of magnetic domains, surface and interface magnetism, giant magneto-resistance). Offered: Sp.

MSE 553 Vacuum Science and Technology (3) Fundamental theory and gas kinetics and treatment of gas flow, working principles of vacuum pumps and gauges, characteristics required of the vacuum components, material selection, fundamentals essential to vacuum system design. Covers both fundamental and practical aspects of modern vacuum science and technology.

MSE 555 Biomimetics: Bioinspired Design and Processing of Materials (4) How biological organisms produce materials with controlled structure, chemistry and hierarchy to attain physical properties far superior to traditional engineering materials. Fundamental biological building materials, their synthesis, and their self-assembly with emphasis on examples of soft and hard tissues.

MSE 559 Thin Film Science, Engineering, and Technology (3) The physics, chemistry, and engineering aspects of thin film deposition and technology. Vapor phase deposition emphasized. Topics include reactor types, vapor phase transport and hydrodynamics, surface and mass transport limited kinetics, nucleation and growth, homoepitaxy, heteroepitaxy, and thin film characterization. Prerequisite: permission of instructor. Offered: jointly with CHEM E 559.

MSE 560 Organic Electronic and Photonic Materials/Polymers (3) Physical and material concepts determining properties of organic electronic and photonic materials. Discusses electronic structure, physico-chemical characterization, and device application. Includes introduction of electronic band structure of polymers, electrically conducting polymers; organic nonlinear optical electroluminescent materials; polymer optical fibers; tow-photon absorption materials for 3-D microfabrication. Offered: jointly with CHEM 564.

MSE 562 Introduction to Electronic Composites (3) Fundamentals of microstructure-macro-

property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 475 or M E 450. Offered: jointly with M E 562; odd years; Sp.

MSE 563 Advanced Composites: Design and Manufacturing (3) Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: MSE 475 or M E 450 or equivalent by permission of instructor. Offered: jointly with M E 563; Sp.

MSE 565 Electron Theory of Materials (3) Solid-state concepts of materials. Atomic bonding, statistical mechanics, Brillouin zone theory. Applications to conduction, optical, and magnetic properties of metals, semiconductors, and insulators. Prerequisite: MSE 466 or equivalent. Offered: W.

MSE 590 Advanced Seminar in Materials Science and Engineering (2) Advanced topics in material science, led by faculty with specific expertise in the area of interest. Topics to be chosen and announced quarterly.

MSE 598 Engineering Materials Problems (4) Involves a concentrated project which may include the design of a system or process, or analysis of a set of data related to the materials engineering area. Requires a professional quality report and an oral presentation of the results.

MSE 599 Special Topics in Materials Science (1-5, max. 5) Studies of special advanced topics in materials science. Prerequisite: permission of instructor. Offered: AWPSP.

MSE 600 Independent Study or Research (*) Offered: AWPSP.

MSE 700 Master's Thesis (*) Offered: AWPSP.

MSE 800 Doctoral Dissertation (*) Offered: AWPSP.

Mechanical Engineering

M E 123 Introduction to Visualization and Computer-Aided Design (4) NW/VLPA Adee Methods of depicting three-dimensional objects and communicating design information. Development of three-dimensional skills through freehand sketching and computer-aided design using parametric solid modeling. Offered: AWPSP.

M E 124 Visualization and Computer-Aided Design Laboratory (2) NW/VLPA Adee Methods of depicting three-dimensional objects and communicating design information. Development of three-dimensional visualization skills through computer-aided design using parametric solid modeling. Offered: AWPSP.

M E 230 Kinematics and Dynamics (4) NW Fabien Kinematics of particles, systems of particles, and rigid bodies; moving reference frames; kinetics of particles, systems of particles, and rigid bodies; equilibrium, energy, linear

momentum, angular momentum. Prerequisite: A A 210.

M E 295 Product Dissection (3) Kumar
Examination of the way products and machines work, their physical operation, the manner in which they are constructed, and the interaction between design, materials, and manufacture. Laboratories involve dissection and assembly of several common industrial and consumer products by student teams. Offered: jointly with IND E 295.

M E 323 Engineering Thermodynamics (5) Kramlich Engineering thermodynamics, including thermodynamic concepts and properties, the first and second laws of thermodynamics, energy conversion, refrigeration, humidification, and combustion. Engineering design applications. Prerequisite: CHEM 142; MATH 126; PHYS 121.

M E 331 Introduction to Heat Transfer (4) Forster Study of heat transfer by conduction, radiation, and convection; elementary heat-exchanger design. Prerequisite: either M E 333 or CEE 342.

M E 341 Energy and Environment (3) NW Malte Energy use. Fossil energy conversion. Oil, gas, coal resources. Air impacts. Nuclear energy principles, reactors, fuel cycle. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 114, or PHYS 121. Offered: jointly with ENVIR 341/ CHEM E 341; A.

M E 354 Mechanics of Materials Laboratory (5) Tuttle Properties and behavior of engineering materials including stress-strain relations, strength, deformation mechanisms, strength, deformation, fracture, creep, and cyclic fatigue. Introduces experimental techniques common to structural engineering, interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal, engineering report writing. Lecture and laboratory. Prerequisite: MSE 170, CEE 220.

M E 355 Introduction to Manufacturing Processes (4) Ramulu Study of manufacturing processes, including interrelationships between the properties of the material, the manufacturing process and the design of components. Interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal, engineering report writing. Prerequisite: M E 354.

M E 356 Machine Design Analysis (4) Kumar Analysis, design, and selection of mechanical and electromechanical subsystems and elements, such as gears, linkages, cams, motors, and bearings. Lecture and laboratory. Prerequisite: M E 354.

M E 373 Introduction to System Dynamics (5) Garbini Mathematical modeling, analysis, and design of physical dynamic systems involving energy storage and transfer by lumped-parameter linear elements. Time-domain response by analytical methods and numeric simulation. Laboratory experiments. Prerequisite: either AMATH 351 or MATH 307; either AMATH 352 or MATH 308; E E 215; M E 230.

M E 374 Systems Dynamic Analysis and Design (5) Garbini Extension of M E 373. Frequency response analysis, generalized impedance concepts and applications, Fourier series analysis and Laplace transform techniques. Modeling and analysis of electromechanical actuators and rotating machinery.

Laboratory experiments and design projects. Prerequisite: M E 373.

M E 392 Concurrent Engineering (3) Focus on the need for and the tools of concurrent engineering in all engineering disciplines. Functional and cross-function organizations, new product development, market-need identification and design for manufacturing are explored. Offered: jointly with IND E 392.

M E 403 Material-Removal Processes (3) Ramulu Cutting and noncutting processes for material removal in the shaping of manufactured products. Study of forces and of power consumption and relative costs in the various processes. Prerequisite: M E 355 which may be taken concurrently.

M E 406 Corrosion and Surface Treatment of Materials (3) Sandwith Corrosion fundamentals and forms (galvanic, crevice, pitting, stress corrosion, erosion, hydrogen and leaching). Principles of design, materials selection, cathodic protection and surface treatments (coatings, carburizing, nitriding and plating) applied to reduce corrosion. Failure analysis applied to case studies.

M E 409 Introduction to Numerical Control and Computer-Aided Manufacturing (3) Ramulu Control system fundamentals, numerical control (NC) machine control systems, and the design aspect of NC machine tools, programming methods of NC machines, computer-aided manufacturing, CNC, DNC, and process optimization. Prerequisite: M E 355 which may be taken concurrently.

M E 415 Sustainability and Design for Environment (3) Cooper Analysis and design of technology systems within the context of the environment, economy, and society. Applies the concepts of resource conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with ENVIR 415/CEE 495.

M E 424 Combustion Systems and Pollutant Formation (4) Malte Combustion theory, including chemical thermodynamics, chemical kinetics, mixing and diffusion, and flame structure. Combustion chamber design concepts and performance. Pollutant formation and combustion methods for minimizing pollutant formation. Prerequisite: M E 323; recommended: M E 331; M E 333.

M E 425 HVAC Engineering (4) Emery Heating, ventilating, and air conditioning of built environment. Human comfort, psychometric processes, load computations, fluid distribution, and controls. Design analysis of HVAC system is taught in the lectures and applied in the class project. Prerequisite: M E 323; M E 331.

M E 426 Sustainable Energy Design (4) Malte Energy systems with renewable (solar) energy and efficient use of energy. Project-based learning: analysis, systems engineering, design, component characteristics, and environmental impacts. Prerequisite: CHEM E/ENVIR/M E/ PHYS 342 or M E 430; recommended: M E 331.

M E 430 Advanced Energy Conversion Systems (4) Kramlich Advanced and renewable energy conversion systems and technologies are treated. Included are high efficiency combined cycles; renewable energy conversion involving

solar, wind, and biomass; direct energy conversion and fuel cells; and nuclear energy. Environmental consequences of energy conversion and environmental control are discussed. Prerequisite: M E 323.

M E 431 Advanced Fluid Mechanics (4) Forster Advanced topics in fluid mechanics, including kinematics, potential theory and vortex dynamics, viscous flow, turbulence, experimental and numerical methods, and design. Prerequisite: M E 333.

M E 432 Gas Dynamics (3) Dynamic and thermodynamic relationships for the flow of a gas. Application of thermodynamic processes involving nozzles, diffusers, compressors, and turbines. Prerequisite: either M E 333 or CEE 342. Offered: by request only.

M E 433 Turbomachinery (4) Thermodynamics, gas dynamics, and fluid mechanics of axial and centrifugal compressors, pumps, and turbines. Selection of components for engineering applications. Design problems and/or laboratory experiments to illustrate operating characteristics of turbomachines.

M E 436 Friction and Wear of Materials (3) Wilson Study of principles of friction and wear behavior of materials and of those material properties that affect such behavior. Principles of lubrication. Applications to design of surfaces for wear resistance. Prerequisite: M E 333; M E 356.

M E 440 Advanced Mechanics of Materials and Solids (3) Labossiere Study of mechanics of deformable bodies, including three-dimensional stress and strain tensors and their transformations. Equations of compatibility, continuity and equilibrium. Elastic constants. Failure criteria including fracture, yield and instability. Deflection relations for complex loading and shapes. Indeterminate problems. Design applications and numerical methods. Prerequisite: M E 354.

M E 442 Renewable Energy (4) NW Malte Introduction to renewable energy. Principles and practices: solar, wind, water, and biomass energy conversion. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 115, or PHYS 122. Offered: jointly with CHEM E 442/ENVIR 442; W.

M E 445 Introduction to Biomechanics (4) Sanders Presents the mechanical behavior of tissues in the body and the application to design of prostheses. Tissues studies include bone, skin, fascia, ligaments, tendons, heart valves, and blood vessels. Discussion of the structure of these tissues and their mechanical response to different loading configurations. An important part of the class is a final project. Offered: jointly with BIOEN 440.

M E 450 Introduction to Composite Materials and Design (3) Tuttle Stress and strain analysis of continuous fiber composite materials. Orthotropic elasticity, lamination theory, failure criterion, and design philosophies, as applied to structural polymeric composites. recommended: MSE 475.

M E 459 Introduction to Fracture Mechanics (3) Ramulu Deformation processes leading to fracture, and linear elastic fracture mechanics. Fatigue crack propagation. Fracture control and failure analysis. Prerequisite: M E 354; M E 356.

M E 460 Kinematics and Linkage Design (3) Ganter Synthesis of linkage-type mechanisms using graphical and computer methods.

M E 468 Air-Pollution Control Equipment Design (3) *Pilat* Designs to control air pollutants from stationary sources. Procedures for calculating design and operating parameters. Fundamental mechanisms and processes of gaseous and particulate control equipment for absorption and adsorption of gaseous pollutants; electrostatic precipitation and filtration of particular pollutants. Actual case studies. Offered: jointly with CHEM E 468/CEE 494.

M E 469 Applications of Dynamics in Engineering (4) *Storti* Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods, Hamilton's principle and Lagrange equations and the design of dynamic system. Prerequisite: M E 374.

M E 470 Mechanical Vibrations (3) *Reinhall* Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-of-freedom linear systems. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite: M E 373.

M E 471 Automatic Control (4) *Berg* Dynamic system modeling; control system stability and performance analysis; compensator design by Bode and root-locus methods. Prerequisite: M E 374.

M E 473 Instrumentation (4) *Garbini* Principles and practice of industrial and laboratory measurement. Dynamics of instrument response; generalized performance analysis of sensor systems; theory of transducers for motion, force, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: M E 374.

M E 474 Systems Modeling and Simulation (3) *Fabien* Unified approach to modeling of systems, and computer simulation of systems behavior. Selecting system variables; writing state, loop, and node equations; modal response and state transition response; system functions and convolution; analogs. Applications to control, vibrations, and other problems. Prerequisite: M E 374.

M E 477 Embedded Computing in Mechanical Systems (4) *Garbini* Analysis of electromechanical systems employing microcomputers for control or data acquisition. Microcomputer architecture, memory organization, assembly language programming, interfaces, and communications. Particular emphasis on design of hardware and software interfaces for real-time interaction with mechanical systems. Weekly laboratory. Prerequisite: M E 374.

M E 478 Finite Element Analysis (4) *Labossiere, Reinhall* Development of theory and concepts of finite element analysis. Applications in all areas of mechanical engineering, including mechanics of solids, heat transfer, and design of dynamical systems. Weekly computer exercises. Prerequisite: M E 123; M E 374; either MATH 308 or AMATH 352.

M E 480 Introduction to Computer-Aided Technology (4) Principles of computer-aided technology. Computer-aided design, engineering, drafting, and manufacturing; computer-aided design systems, geometry, computer graphics, hardware, computer-aided vehicle/system design synthesis. System demonstrations, laboratories, and site visits. Prerequisite: M E 123; CSE 142.

M E 481 Combustion Engines and Alternatives (4) *Kramlich, Malte* Thermodynamics, fuels, performance, combustion, and exhaust emissions control for spark ignition and compression ignition piston engines. New technologies, including hybrid combustion-electric fuel cell engines. Principles and practice. Prerequisite: M E 323. Recommended: M E 333.

M E 485 Introduction to Electronic Packaging and Materials (3) *Taya* The governing equations of transport phenomena: mechanical, thermal, and electromagnetic behavior, thermomechanical and electromagnetic properties of packaging materials, electromagnetic characteristics of circuit and transmission lines, thermal management and reliability analysis of packaging, interconnect and material processing technology. Prerequisite: MSE 170. Offered: jointly with MSE 485.

M E 487 Laboratory in Electronic Packaging and Materials (1) *Taya, Stoebe* Laboratory course to accompany M E 485 Experiments related to design, processing and reliability of electronic packaging used in consumer electronics. Corequisite: M E 485. Offered: jointly with MSE 487.

M E 490 Naval Architecture (3) *Adee* Theory of naval architecture; ship's lines, hydrostatic curves, intact and damaged stability, launching.

M E 491 Naval Architecture (3) *Adee* Theory of naval architecture; strength, ABS rules, water waves, ship and platform motions.

M E 492 Naval Architecture (3) *Adee* Theory of naval architecture; dimensional analysis, resistance, model testing, propellers, steering.

M E 495 Mechanical Engineering Design (4) Design laboratory involving the identification and synthesis of engineering factors to plan and achieve specific project goals. Current literature and prerequisite texts are used as reference sources. Lecture and laboratory. Prerequisite: M E 395.

M E 496 Technology-Based Entrepreneurship (3) Concentrates on hands-on aspects of innovation and entrepreneurial enterprise development. Examines relationships between innovation, iterative prototyping, and marketing testing. Students identify market opportunities, create new technology-based products and services to satisfy customer needs, and construct and test prototypes. Prerequisite: IND E 250. Offered: jointly with IND E 496.

M E 498 Special Topics in Mechanical Engineering (1-5, max. 6) Lecture and/or laboratory. Maximum of 6 credits may be applied toward an undergraduate degree.

M E 499 Special Projects (2-5, max. 6) Written report required.

M E 501 Modern Manufacturing Processes (3) *Ramulu* General survey and introduction to modern manufacturing engineering processes. Fundamental principles and practices of modern manufacturing processes. Case studies and exercises relating the course material directly to modern industrial practice. Offered: A.

M E 502 Plasticity and Metal Forming (3) *Wilson* Stress-strain and stress-strain-rate relations in metal forming; plastic instability. Work of deformation. The slip-line field, load bounding,

applications to frames, drawing, forging, and extrusion. Offered: odd years; Sp.

M E 504 Introduction to Microelectro Mechanical Systems (4) Theoretical and practical aspects in design, analysis, and fabrication of MEMS devices. Fabrication processes, including bulk and surface micromachining. MEMS design and layout. MEMS CAD tools. Mechanical and electrical design. Applications such as micro sensors and actuators, or chemical and thermal transducers, recent advances. Offered: jointly with E E 502/MSE 504.

M E 505 Computer Integrated Manufacturing (3) *Wilson* Design and analysis of advanced manufacturing systems from a strategic as well as technological perspective. Focus on information generation, management, and coordination aspects of complex manufacturing organizations. Examination of system integration alternatives and consequences for relationships with customers and suppliers. Offered: jointly with IND E 531; W.

M E 507 Computational Methods in Design and Manufacturing (3) *Wu* Sampling size and accuracy: uniform, random, and Hammersley. Approximation of curves and surfaces. Optimization: minima and maxima. Search and gradient techniques. Line integral for geodesic and optimal path. Offered: jointly with IND E 533; W.

M E 508 Theory and Design for Mechanical Measurements (3) Fundamental concepts of mechanical measurements, principles of sensors and transducers, signal conditioning and data acquisition, advanced experiment planning and analysis, and applications in mechanical engineering. Offered: .W.

M E 510 Mathematical Foundations of Systems Theory (4) *Damborg* Mathematical foundations for system theory presented from an engineering viewpoint. Includes set theory; functions, inverse functions; metric spaces; finite dimensional linear spaces; linear operators on finite dimensional spaces; projections on Hilbert spaces. Applications to engineering systems stressed. Prerequisite: graduate standing or permission of instructor. Offered: jointly with A A 546/CHEM E 510/E 510; A.

M E 518 Seminars on Advances in Manufacturing and Management (1) *Ramulu* Current topics and advances made in manufacturing and management. Topics presented by invited speakers from academia and industry. Emphasis on the multidisciplinary nature of manufacturing and management Offered: jointly with IND E 518; AWSp.

M E 519 Seminar (0-) Credit/no credit only. Offered: AWSp.

M E 520 Seminar (-1, max. 6) Credit/no credit only. Offered: AWSp.

M E 521 Thermodynamics (3) *Kramlich* Fundamental concepts of temperature, thermodynamic properties, and systems. The first, second, and combined laws. Development of the relations of classical thermodynamics. Introduction to statistical thermodynamics. Prerequisite: M E 323 and graduate standing in mechanical engineering or permission of instructor. Offered: A.

M E 522 Thermodynamics (3) *Malte* Topics from statistical thermodynamics, including the

Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Solutions of the Schrodinger wave equation and evaluation of the partition function for translation, rotation, and vibration. Prerequisite: M E 521 or permission of instructor. Offered: by request only.

M E 523 Energy and Environment Seminar (1) *Malte* Student discussions of topics in combustion science and technology, alternative fuels, renewable energy, environmental consequences of energy conversion, and design for environment. Also, presentations by outside experts. May be repeated for credit. Credit/no credit only. Offered: AWSp.

M E 524 Combustion (3) *Kramlich* Chemical and physical processes of combustion with applications to design of combustors, fuel selection, and consideration of environmental effects. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: odd years; Sp.

M E 525 Acoustics in Engineering I (3) *Forster* Acoustic wave transmission, reflection, refraction, and diffraction. Review of continuum mechanics and examples from electromechanical systems. Prerequisite: graduate standing in mechanical or electrical engineering, or permission of instructor. Offered: W.

M E 526 Acoustics in Engineering II (3) *Forster* Continuation of 525. Material differs each year, covering such topics as scattering, moving media, ultrasonics, acoustic holography, optoacoustics, transducer design, propagation in an isotropic medium. Prerequisite: M E 525 or permission of instructor. Offered: Sp.

M E 528 Acoustics of Environmental Noise (4) Offered: jointly with CEE 554.

M E 530 Heat Conduction and Radiation (3) *Mescher* Heat conduction advanced fundamentals, emphasizing microscale applications. Radiative transfer for transparent and for absorbing and scattering media, emphasizing combustion, biomedical, and atmospheric/oceanic environmental applications. Forward and inverse problems for both conduction and radiation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

M E 531 Conductive Heat Transfer (3) Analysis of steady-state and transient heat conduction in single- and multidimensional systems by mathematical, graphical, numerical, and analogical methods. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: by request only.

M E 532 Convective Heat Transfer (3) *Kramlich* Introduction to fluid flow and boundary-layer theory as applicable to forced- and natural-convection heat transfer. Condensation and boiling heat transfer. Prerequisite: graduate standing or permission of instructor. Offered: Sp.

M E 533 Fluid Mechanics I (3) *Riley* Basic conservation laws and kinematics of fluid flow constitutive relationships, Newtonian fluids, dimensional analysis, vorticity dynamics, inviscid flows, applications. Offered: A.

M E 534 Fluid Mechanics II (3) *Riley* Review of basic principles, some exact solutions and their interpretation, waves (water waves, sound waves, shock waves), boundary layers, jets and wakes, flow stability, turbulence, applications.

Prerequisite: M E 533 or permission of instructor. Offered: W.

M E 535 Computational Techniques in Mechanical Engineering (3) *Emery* Advanced heat transfer studies of interest to mechanical engineers. Subject coverage varies from year to year. Prerequisite: permission of instructor. Offered: Sp.

M E 537 Topics in Fluid Mechanics (3) Selected fluid mechanics relevant to current advances in research and application. Topics selected vary with faculty and student interest, but have included flow stability, special topics in turbulence, and turbulent reacting flows. Offered: by request only.

M E 538 Turbulent Boundary Layer Theory (3) Characteristic features of turbulent boundary layers; development of the turbulent boundary layer equations; equilibrium boundary layers; integral methods of solution based on power law and wall-wake velocity profiles; methods of solution based on higher order constitutive equations; application to diffuser flows and free shear flows; new developments and physical models. Offered: odd years; A.

M E 541 Fatigue of Materials (3) *Ramulu* Macro and micro aspects of fatigue of metals and fatigue mechanisms. Analytical methods for fatigue and life assessment in advanced materials. Offered: W.

M E 543 Fluid Turbulence (3) Methods of characterizing fluid turbulence; probability concepts; spatial and temporal velocity correlations; spectral energy transfer; turbulent diffusion; isotropic turbulence and Kolmogoroff's hypothesis; Taylor's hypothesis; hot-wire measurement techniques. Prerequisite: 3 credits of graduate level fluid mechanics or permission of instructor. Offered: even years; W.

M E 544 Advanced Turbulence Modeling Techniques (3) *Riley* The Reynolds stress transport equations; plane homogeneous shear flow; modeling the pressure-strain, diffusion, and dissipation rate correlation tensors; one and two-equation turbulence models; near-wall turbulence and wall functions; limitations of length scale and eddy viscosity modeling. Prerequisite: 3 credits of turbulence related course work. Offered: even years by request only; Sp.

M E 547 Linear Systems Theory (4) Linearity, linearization, finite dimensionality, time-varying vs. time-invariant linear systems, interconnection of linear systems, functional/structural descriptions of linear systems, system zeros and invertibility, linear system stability, system norms, state transition, matrix exponentials, controllability and observability, realization theory. Prerequisite: either A A 447, E E 447 or M E 447. Offered: jointly with E E 547/A A 547; A.

M E 548 Linear Multivariable Control (3) Introduction to MIMO systems, successive single loop design comparison, Lyapunov stability theorem, full state feedback controller design, observer design, LQR problem statement, design, stability analysis, and tracking design. LQG design, separation principle, stability robustness. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with A A 548/E E 548.

M E 549 Estimation and System Identification (3) Fundamentals of state estimation for linear and nonlinear systems. Discrete and continuous systems. Probability and stochastic systems

theory. Models with noise. Kalman-Bucy filters, extended Kalman filters, recursive estimation. Numerical issues in filter design and implementation. Prerequisite: E E 505 or AMATH 506 or STAT 506; recommended: 548 or A A 548. Offered: jointly with A A 549/E E 549.

M E 550 Nonlinear Optimal Control (3) Calculus of variations for dynamical systems, definition of the dynamic optimization problem, constraints and Lagrange multipliers, the Pontryagin Maximum Principle, necessary conditions for optimality, the Hamilton-Jacobi-Bellman equation, singular arc problems, computational techniques for solution of the necessary conditions. Prerequisite: graduate standing; recommended: A A 548 or E E 548. Offered: jointly with A A 550/E E 550; odd years.

M E 551 Elasticity I: Elastostatics (3) *Taya* Elastostatics, including general formulations of 2D and 3D elastostatic problems (stress function method, complex variable method, displacement potential method). Eshelby's method is emphasized and used to solve 2D and 3D problems with special application to composite materials. Offered: W.

M E 552 Elasticity II: Viscoelasticity and Elastodynamics (3) *Taya* Elastodynamics includes wave propagation in linear elastic and linear viscoelastic solids where solids are monolithic materials, composite materials. Viscoelasticity part includes the stress-strain equations in terms of convolution integral, Fourier transform and Laplace transform modes. Simple and fundamental problems are solved by several techniques as demonstration. Offered: even years; Sp.

M E 553 Adhesion Mechanics (3) *Tuttle* Introduction to adhesive systems and test/evaluation techniques. Stress/strain analysis methods used with adhesive joints. Examples of practical applications. Prerequisite: graduate student status or permission of instructor. Offered: even years; Sp.

M E 555 Thermoelasticity (3) *Emery* Basic equations of thermoelasticity for isotropic elastic solids. Analysis of disks, cylinders, spheres, beams, and plates under steady temperature and sudden and slow heating and cooling. Introduction to thermoelastic stability. Prerequisite: M E 551 or permission of instructor. Offered: by request only.

M E 556 Experimental Stress Analysis I (3) *Tuttle* Theory and practice of experimental techniques including strain gages and strain gage-based devices, thermocouples, LVDTs, and transducer design. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: A.

M E 557 Experimental Stress Analysis II (3) *Tuttle* Theory and practice of optical mechanics, including interferometric techniques (moire and holographic), geometric moiré methods, and photoelasticity. Lecture and laboratory. Prerequisite: graduate standing or permission of instructor. Offered: even years; W.

M E 559 Introduction to Fracture Mechanics (3) *Ramulu* Applications of linear fracture mechanics to failure analysis and fracture control based on actual case studies. Fracture toughness and fatigue testing techniques, crack initiation and propagation fatigue life prediction of mechanical components subjected to environmental effects. Offered: W.

M E 560 Advanced Theory of Fracture (3)
Ramulu Theories of linear fracture mechanics, fracture dynamics, ductile fracture, stable crack growth and mixed mode fracture. Discussion of advanced topics from recent literature. Prerequisite: M E 559 or permission of instructor. Offered: even years; Sp.

M E 562 Introduction to Electronic Composites (3)
Taya Fundamentals of microstructure-macro-property relation of electronic composites. This course covers applications (computers, laser packages, medical devices, MEMS, avionics), functions (mechanical, thermal, electromagnetic and optical), microstructure-macro-property relations, processing issues, and modeling of electronic composites. Recommended: 450 or MSE 423. Offered: jointly with MSE 562; Sp.

M E 563 Advanced Composites: Design and Manufacturing (3) Manufacturing and processing techniques of metal-, polymer-, and ceramic-matrix composites; design considerations related to manufacturing techniques; non-destructive testing of composite structures. Fiber-matrix interfacial features and interactions. Interfacial thermodynamics applied to selection of fiber-matrix combinations. Prerequisite: M E 450 or MSE 423 or equivalent by permission of instructor. Offered: jointly with MSE 563; Sp.

M E 564 Mechanical Engineering Analysis (3)
Storti Application of mathematical methods to the description and analysis of systems in mechanical engineering. Analogies in heat transfer, fluid flow, stress distribution, dynamics, and feedback control. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: A.

M E 565 Mechanical Engineering Analysis (3)
Storti Applications of vectors, matrices, and partial differential equations to mechanical engineering systems, including computational techniques and analogies. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: W.

M E 566 Introduction to Random Processes (3)
Kosaly Probability and random variables. Ensemble averaging, probability density function, auto- and cross-correlation functions. Brownian motion, Poisson process. Ergodicity. Frequency domain analysis, auto- and cross-spectrum, transfer function. Fundamentals of digital spectral analysis. Applications in fluid mechanics, acoustics and vibrations. Offered: by request only; even years; A.

M E 572 Methodologies for Engineering Design: Conceptual Design (3)
Kumar Methodologies particularly useful in the conceptual or preliminary phase of a design. The design process. Impact of formulating independent functional requirements. Physical and functional coupling in design. Case studies in conceptual design of products and processes. Prerequisite: graduate standing or permission of instructor. Offered: even years; W.

M E 573 Methodologies for Engineering Design: Probabilistic Mechanical Design (3)
Ramulu Study, implementation of probabilistic methods to design. Loading, geometry, stress, strain/deflection described as random variables, compared to material properties/behavior in terms of random variables. Design, analysis, reliability, risk analyses conducted on common structures with results compared to conventional deterministic approaches. Projects using

probabilistic methods to optimize selected component designs. Offered: even years; Sp.

M E 578 Optimization in System Sciences (3)
Mesbahi Covers convex sets, separation theorems, theorem of alternatives and their applications, convex analysis, convex functions, conjugation, subgradients, convex optimization, duality and applications, linear and semi-definite programming. Linear matrix inequalities, optimization algorithms, applications in system theory and control, bilinear, rank minimization, optimization software. Recommended: A A/M E/E E 547. Offered: jointly with A A/E E 578; W.

M E 579 Fluid Power Systems (3) Design, analysis, and control of fluid power systems. Steady-state analysis of valves, actuators, and transmissions. Dynamic modeling, response, stability, and control analysis via linear element representation and computer simulation. Prerequisite: graduate standing in mechanical engineering or permission of instructor. Offered: Sp.

M E 581 Digital Control (3)
Chizeck Sampled-data systems, and z-transform. Frequency domain properties. Sampling D/A and A/D conversion. Controller design via discrete-time equivalents, direct methods, state feedback and observers. Quantization effects. LQR control and introduction to LQG optimal control. Prerequisite: either E E/A A or M E 548. Offered: jointly with A A/E E 581; W.

M E 582 Introduction to Discrete Event Systems (3)
Berg Modeling DES with automata and Petri nets. Languages. State estimation and diagnostics. Control specifications. Feedback control. Dealing with uncontrollability and unobservability. Dealing with blocking. Timed automata and Petri nets. Prerequisite: A A 447/E E 447/ M E 471. Offered: jointly with A A 582/E E 582; even years; Sp.

M E 583 Nonlinear Control Systems (3) Analysis of nonlinear systems and nonlinear control system design. Phase plane analysis. Lyapunov stability analysis. Describing functions. Feedback linearization. Introduction to variable structure control. Prerequisite: A A/E E 447/M E 471. Offered: jointly with E E/A A 583; odd years; Sp.

M E 584 Combustion in Airbreathing Propulsion (3) Fundamentals of gasdynamics, mixing, and thermodynamics applies to the analysis and design of gas turbine, ramjet and scramjet engine combustors, with treatment of computer simulation. Offered: by request only.

M E 585 System Identification and Adaptive Control (3) Theory and methods of system identification and adaptive control. Identification of linear-in-parameter systems, using recursive LS and extended LS methods; model order selection. Indirect and direct adaptive control. Controller synthesis, transient and stability properties. Prerequisite: either E E 505 or AMATH 506 or STAT 506; E E 548/A A 548/M E 548. Offered: jointly with M E 585/E E 585.

M E 588 Dynamics and Vibrations (3)
Shen Variational techniques, Hamilton's principle, Lagrange's equations applied to dynamics of particles and rigid bodies. Vibration analysis of multi-degree-of-freedom and continuous systems. Prerequisite: graduate standing in engineering or permission of instructor. Offered: A.

M E 589 Vibrations (3)
Storti Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Nonlinear systems are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; W.

M E 590 Vibrations (3)
Reinhal Study of systems with nonlinear damping and restoring forces excited by deterministic or random inputs. Applications in measurement, testing, and design of mechanical systems. Random inputs are emphasized. Prerequisite: M E 588 or permission of instructor. Offered: even years; Sp.

M E 591 Robotics and Control Systems Colloquium (1, max. 3)
Berg Colloquium on current topics in robotics and control systems analysis and design. Topics presented by invited speakers as well as on-campus speakers. Emphasis on the cross-disciplinary nature of robotics and control systems. Credit/no credit only. Offered: jointly with A A/CHEM E/E E 591; AWSp.

M E 593 Feedforward Control (3)
Devasia Design feedforward controllers for precision output tracking; inversion-based control of non-minimum-phase systems; effect of plant uncertainty on feedforward control; design of feedforward controllers for applications such as vertical take off and landing aircraft, flexible structures and piezo-actuators. Prerequisite: A A 547/E E 547/M E 547. Offered: jointly with A A/ E E 593.

M E 594 Robust Control (3) Basic foundations of linear analysis and control theory, model realization and reduction, balanced realization and truncation, stabilization problem, coprime factorizations, Youla parameterization, matrix inequalities, H-infinity and H2 control, KYP lemma, uncertain systems, robust H2, integral quadratic constraints, linear parameter varying synthesis, applications of robust control. Offered: jointly with A A 594/E E 594; odd years; Sp.

M E 598 Topics in Research (1) Doctoral seminar. Credit/no credit only. Offered: AWSp.

M E 599 Special Projects (1-5, max. 9) Written report required. Prerequisite: permission of department Chairperson. Offered: AWSpS.

M E 600 Independent Study or Research (*) Written report required. Offered: AWSpS.

M E 700 Master's Thesis (*) Offered: AWSpS.

M E 800 Doctoral Dissertation (*) Offered: AWSpS.

Technical Communication

T C 100 Introduction to Technical Communication (5) Topics may include: virtual communities, human-computer interaction, web design, usability testing, visual design, and others. Explores course content through individual and group hands-on projects. Offered: A.

T C 231 Introduction to Technical Writing (3) Principles of organizing, developing, and writing technical information. Report forms and rhetorical patterns common to scientific and technical disciplines. Technical writing conventions such as headings, illustrations, style, and tone. Numerous written assignments required. Required for all engineering majors. Prerequisite: either C LIT 240, both ENGL 104 and ENGL 105, ENGL 111,

ENGL 121, ENGL 131, ENGL 182, ENGL 197, ENGL 198, ENGL 199, or ENGL 281. Offered: AWSpS.

T C 310 Introduction to Communication Design (5) *Turns* Functions of, and relationships among, major software tools in the context of common technical communication design problems. Students practice explaining and justifying design solutions in terms of key features and user characteristics. Offered: ASp.

T C 317 Survey of Usability Research Techniques(5) Introduces usability research methods used in the product-development process; contextual inquiry, surveys and interviews, focus groups, user profiling, usability testing, cognitive walkthroughs, heuristics, and others. Offered: Sp.

T C 318 Survey of User Experience Design (5) Provides a project-based introduction to the user interface design process and is oriented toward practical methods for approaching a design problem. Focuses on developing conceptual designs based on user need. Offered: Sp.

T C 319 Survey of Concepts in Human-Computer Interaction (5) Studies the social, cognitive, behavioral and contextual aspects of information systems and informational dimensions of the human-computer interface, and other user-centered design concepts. Surveys research literature of human information behavior, as well as ethical standards. Offered: Sp.

T C 333 Advanced Technical Writing and Oral Presentation (4) Emphasis on the presentation of technical information to various audiences. Style of writing required for proposals, reports, and journal articles. Oral presentation principles, including use of visuals, as well as organizing and presenting an effective talk. For engineering majors. Prerequisite: T C 231. Offered: AWSpS.

T C 400 Scientific and Technical Communication (5) *Kasonic, Kolko* Principles and practices of writing to communicate scientific and technical information to a variety of readers, including the expert, general scientific and technical reader, manager, and general public. Examines research and issues in the TC field including social contexts and environments (legal, ethical, cultural). Required of technical communication majors. Prerequisite: T C 231. Offered: ASp.

T C 401 Style in Scientific and Technical Writing (5) *Coney, Spyridakis* Grammatical structures and stylistic strategies within specific professional contexts. Achieving clarity and conciseness through word choice and placement, using a variety of sentence structures for appropriate emphasis, handling details, establishing effective tone. Required of technical communication majors. Prerequisite: T C 231. Offered: ASp.

T C 402 Scientific and Technical Editing (5) *Farkas, Kolko* Editorial responsibilities and practice in the communication of scientific and technical information; the editor's role both as editor and as supervisor of publication groups. Addresses managing collaborative teams and basic SML concepts and metadata. Required of technical communication majors. Prerequisite: T C 400 with a minimum grade of 3.0; T C 401 with a minimum grade of 3.0. Offered: W.

T C 403 Publication Project Management (3) *Plumb* Responsibilities and practice in managing

publication projects in scientific and technical organizations. Project design, coordination, production, and evaluation, including planning, organizing, staffing, and directing. Required of technical communication majors. Offered: WSp.

T C 407 Software User Assistance (5) *Farkas* Concepts and skills for preparing manuals, online help systems, performance-support systems, and other forms of locally stored and Web-based software user assistance. Includes principles of human-computer interaction, usability evaluation, and the software-development process. Students create both end-user and developer documentation. Prerequisite: T C 310. Offered: W.

T C 408 Public Documents: Proposals, EISs, Assessments (3) *Bereano* Analyzing special documents of public character: proposals, EISs, questionnaires, technology assessments. Understanding socio-political milieu in which they are planned, organized, written; the specialized audiences (e.g., agencies with their missions, guidelines, constituencies; citizen groups; commercial interests) they serve. Documents, the decision-making process. Offered: odd years; Sp.

T C 409 Writing for Publication (3) *Coney* Writing for professional and trade periodicals in science, engineering, and technology; examination of the publication process, including the roles of author, editor, and reviewer; selecting the appropriate periodical; organizing and writing the article. Prerequisite: T C 400; T C 401. Offered: W.

T C 411 Visual Media in Technical Communication (5) I&S/VLPA *Williams* Use of visuals in print and electronic communication. Topics include vision, perception, comparison of text and visual media principles for the selection and use of visual media, information graphics icons, page and screen design typography, and color. Offered: ASp.

T C 412 Print Production (5) *Sauer, Williams* Introduction to print production for technical communicators. Topics include digital pre-press, printing, binding, and finishing. Prerequisite: T C 411. Offered: W.

T C 415 Production Editing (4) *Williams* The editorial role in the preparation of text and visual materials for production. The editor's responsibilities and prerogatives as they relate to those of other professionals in the production phase of the publications field.

T C 420 Introduction to Technology as a Social and Political Phenomenon (5) I&S *Bereano* Introductory survey presenting some of the issues pertaining to technology and social change, technology and values. Emphasis on the social, political, and economic aspects of current problems that have important technological components. Prior technical background not required; readings from diverse sources. Offered: A.

T C 422 Style in Technical Writing (3) Grammatical structures and stylistic strategies. Achieving clarity and conciseness through word choice and placement, using a variety of sentence structures for appropriate emphasis, handling details, establishing effective tone.

T C 425 Technology Assessment (5) I&S *Bereano* In-depth analysis of the concept, practice, and methods of technology assessment (policy analysis that concentrates on social

consequences of technological development); social, political, economic, and environmental impacts of new technologies; options for channeling these developments; and relevant decision-making institutions and processes. Offered: W.

T C 428 Policy Dimensions of Genetic Engineering (3) I&S *Bereano* Explores technological discourse in public policy formation and decision-making regarding genetic engineering, analyzing a variety of media and formats to explore the contending ideological paradigms, imagery, and argumentation used by the major policy actors. No prerequisite, although prior work in biology, communication, or policy sciences is useful. Offered: Sp.

T C 435 Introduction to Content Management (3) Principles and practices of building, managing and using content management systems in the technical communication workplace. Examines both the intricacies of collaborative workflow technologies and the organizational contexts that surround them.

T C 436 Design and Authoring of CAI (3) *Winn* Introduction to the design of computer-assisted-instructional programs. Types of learning, characteristics of effective instruction. Students design and produce CAI programs using authoring systems for computers. Offered: jointly with EDC&I 436; A.

T C 437 Web Design and Web Publishing (5) I&S/VLPA *Farkas* Design principles and skills including navigation, functional design, visual design, and content development. Includes the ongoing process of Web publishing. Addresses societal issues pertaining to the Web and Internet. Students build a website and plan for ongoing Web publishing. Prerequisite: T C 310; T C 411. Offered: Sp.

T C 438 Web Technologies (5) Markup languages and styles, JavaScript, Flash, Photoshop, and the fundamentals of digital sound and video. Includes an introduction to server-side technologies. Students expand their existing design skills to encompass the use of these Web technologies. Prerequisite: T C 310; T C 437.

T C 440 Science and Engineering News Writing (5) *Illman* Explores the science news publishing process, from researching topics and interviewing sources to the structure of news articles and production. Writing assignments address the press release, news brief, and news articles. Offered: A.

T C 454 Alternative Technology (3) I&S *Bereano* Exploration of the evolution of technological forms that are small-scaled, decentralized, emphasizing the public policy aspects of these developments. Topics include the relationship between alternative technologies and worker-controlled enterprises, community planning, the politics of technological change, the Third World, and decentralized development. Background in engineering or technical design is not required. Offered: A.

T C 455 User Interface Design (4) *Furness* Design oriented to cover fundamentals of user interface design; models on human computer interaction, software psychology, input devices, usability, cognitive and perceptual aspects of human-computer interaction, advanced interface, and research methodologies are discussed. Offered: jointly with IND E 455; A.

T C 461 Japanese for Technical and Business Professions I (5) VLPA Kato Strengthens knowledge of grammar and vocabulary and applies this to basic technical business communication situations. Covers cultural concepts underlying these situations. Reviews authentic materials on technology-related topics. Teaches skills to analyze sentence structure for accurate interpretation. Lab work required. Placement test before admission. Offered: A.

T C 462 Japanese for Technical and Business Professions II (5) VLPA Kato Covers the functional/situational conversation skills necessary in technical and business communication situations, plus the cultural concepts underlying these situations. Reviews skills (such as prediction) for more effective reading and improves skills for analyzing complex sentence structure. Additional grammar, vocabulary, and kanji are introduced. Lab work required. Prerequisite: T C 461. Offered: W.

T C 463 Japanese for Technical and Business Professions III (5) VLPA Kato Covers the functional/situational conversation skills necessary in technical and business communication situations, plus the cultural concepts underlying these situations. Further improves skills introduced in previous courses and reviews skills for understanding inter-sentence structure. Additional grammar, vocabulary, and kanji introduced. Lab work required. Prerequisite: T C 462. Offered: Sp.

T C 493 Senior Study (5) Integration of knowledge and skills acquired during major program into one paper or project. Offered: AWSpS.

T C 495 Professional Practice (3-10, max. 10) Williams Supervised internship in a publications organization approved by the faculty adviser. A minimum of one internship is required of students majoring in technical communication. Credit/no credit only. Offered: AWSpS.

T C 496 Directed Research in Technical Communication (1-5, max. 10) Students, working in teams under the supervision of individual faculty members, review relevant literature, pose research questions, design and conduct studies, and present the results in papers prepared either for submission to a professional journal or for presentation at a professional conference. Credit/no credit only. Offered: AWSpS.

T C 497 Study Abroad: Technical Communication (3-5, max. 15) Upper-division technical communication courses, for which there are no direct University of Washington equivalents, taken through the Department of Technical Communication's Study Abroad Program. Offered: S.

T C 498 Special Topics (1-5, max. 15) Special topics in technical communication to be offered occasionally by permanent or visiting faculty members.

T C 499 Special Projects (1-5, max. 10) Individual undergraduate projects in technical communication. Offered: AWSpS.

T C 501 Theoretical Dimensions of Technical Communication (4) Coney, Sauer Theories and research drawn from a variety of fields that inform such topics as the historical and social context of technical communication, the aims of technical discourse, readability, invention and

audience, audience analysis, technical style, and graphics. Prerequisite: admission to an engineering master's program or permission of instructor. Offered: A.

T C 502 Empirical Traditions in Technical Communication (4) Williams Introduction to empirical traditions that inform research and practice in field of technical communication. Topics include epistemological assumptions underlying empirical research, empirical methods, and survey of results of empirical research on effects of text and visual media on comprehension, recall, and performance. Prerequisite: graduate standing or permission of instructor. Offered: W.

T C 505 Computer-Assisted Communication (4) Kolko Explores computer-assisted communication from three perspectives: (1) cultural roles of communication technologies; (2) relationships between communication and information including information technologies in the workplace, academe, and other settings; and (3) application to design including models for audience analysis, task analysis, and cognitive systems engineering. Prerequisite: graduate standing or permission of instructor. Offered: A.

T C 509 Writing the Scientific Article (3) Haselkorn, Illman Examination of principles and practice of writing research manuscripts, articles, abstracts, and oral presentations. Detailed examination of scientific publication process includes issues of style, organization, and ethics. Students draft, critique, and revise their own manuscripts and learn to review the manuscripts of others. Offered: Sp.

T C 510 Information Design (4) Farkas Examination of the design principles and procedures underlying the creation of both print and electronic information presentations. Topics include: print vs. electronic media, designing for the page and screen, information topologies, and hypermedia. Seminar includes a design project. Prerequisite: T C 501 or permission of instructor. Offered: Sp.

T C 511 Visual Media in Technical Communication (5) Williams Use of visuals in print and electronic media. Topics include vision, attention and perception, semiotics, depiction, information graphics, icons, typography, and principles of page and screen design.

T C 512 International Technical Communication (4) Spyridakis Examines theory, research, and practice in the internationalization and localization of paper and electronic documents. Topics include cultural models and schemata, contrastive rhetoric, controlled languages, translation, visuals, and usability testing. Prerequisite: graduate standing or permission of instructor. Offered: W.

T C 515 Ecological Information Systems (4) Introduction to cognitive work analysis framework. Prepares for active role in design and evaluation of information systems. Familiarization with basic concepts of cognitive systems engineering and practice in field study, data analysis, and transforming field findings into requirements for the design of an information system. Offered: jointly with LIS 515.

T C 516 Research Theory and Application in Technical Communication (4) Spyridakis Introduction to research methods in technical communication. Students examine the relationship between theory and research,

hypothesis testing, experimental designs, modes of observation, sampling, validity, and data analysis and interpretation. Prerequisite: introductory statistics course. Offered: Sp.

T C 517 Usability Testing (4) Ramey Discusses the human-computer interface (HCI) as the communicative aspect of a computer system. Analyzes usability issues in HCI design, explores design-phase methods of predictability, and introduces evaluative methods of usability testing. Prerequisite: substantial experience with computers and graduate standing, or permission of instructor. Offered: W.

T C 518 User-Centered Design (4) Turns Explores the user-centered design paradigm from a broad perspective, emphasizing how user research and prototype assessment can be integrated into different phases of the design process. Students learn to think like a user-centered designer and carry out activities that are key to user-centered design. Offered: jointly with IND E 545.

T C 520 Technical Communication Systems (4) Haselkorn Emphasizes the role and function of communication as a key to understanding organizational frameworks and managerial practices. Traditional and innovative approaches to viewing and managing technical communication. Roles, responsibilities, impact of technology. Offered: Sp.

T C 521 Seminar: Current Issues in Technical Communication (1-2, max. 3) Presentations on current issues in technical communication. Credit/no credit only. Prerequisite: T C graduate student status or permission of instructor. Offered: AW.

T C 523 Seminar: Issues in TC Scholarship and Professional Activity (1, max. 3) Exploration of advanced issues in technical communication scholarship and practice. Credit/no credit only. Prerequisite: TC PhD student status or permission of instructor. Offered: AWSp.

T C 525 Assessing Communications Technologies (4) Bereano Analysis of development, deployment of new communication technologies; emphasis on public policy issues they present (e.g., videotelephone, mobile telephoning, hypermedia, electronic message transfer, virtual reality). Impacts explored include access, privacy, civil liberties; power of elites; changes in social organization. Prerequisite: T C 425 or other background in policy analysis, technology, and society. Offered: Sp.

T C 535 Content Management (4) Kasonic Principles and practices of building, managing, and analyzing content management systems in the technical communication workplace. Collaborative workflow technologies and the organizational contexts that surround them.

T C 537 User-Centered Web Design (5) Farkas Theory and practice of the user-centered web development process. Principles and processes for documenting and implementing various development stages, including requirements analysis, user needs analysis, information architecture, prototyping, mockups, and production.

T C 540 SciTech Writing Practicum I (4) Illman An advanced experience in science and engineering news writing for graduate students and upper division undergraduates. Participants serve as science writing interns on the staff of

Northwest Science & Technology magazine and develop a portfolio of professional quality science/technology news articles which may be eligible for publication in the magazine. Prerequisite: T C 498 or permission of instructor. Offered: W.

T C 541 SciTech Writing Practicum II (4) *Illman* Advanced science writing, focusing on the narrative feature and other forms of creative non-fiction used to present technical content to general audiences. Participants develop a portfolio of professional quality science/technology news articles which may be eligible for publication in Northwest Science and Technology magazine. Prerequisite: T C 540 or permission of instructor. Offered: Sp.

T C 596 Directed Research in Technical Communication (1-5, max. 10) Students, working in teams under the supervision of

individual faculty members, review relevant literature, pose research questions, design and conduct studies, and present the results in papers prepared either for submission to a professional journal or for presentation at a professional conference. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

T C 597 Approaches to Teaching Technical Communication (1-2, max. 2) *Plumb* Readings in pedagogical theory of technical communication and discussion of practical applications. Credit/no credit only. Prerequisite: concurrent teaching appointment or permission of instructor. Offered: AWSpS.

T C 598 Special Topics (1-5, max. 6) Prerequisite: permission of instructor.

T C 599 Special Projects (1-5, max. 5) Written report required. Prerequisite: permission of graduate adviser or committee chair. Offered: AWSpS.

T C 600 Independent Study or Research (*) Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

T C 601 Internship (2-10, max. 10) Written report required. Prerequisite: permission of committee chair. Offered: AWSpS.

T C 700 Master's Thesis (*) Prerequisite: permission of thesis adviser. Offered: AWSpS.

T C 800 Doctoral Dissertation (1-10, max. 30) Credit/no credit only. Prerequisite: permission of thesis advisor. Offered: AWSpS.

College of Forest Resources

College of Forest Resources

CFR 500 Graduate Orientation Seminar (1) Introduction to graduate study. Presentations on College resources and services and current research in the College division. Offered: A.

CFR 501 Forest Ecosystems-Community Ecology (5) *Brubaker* Community ecology of forest ecosystems. Quantitative methods of community description. Role of limiting factors, competition and disturbance in determining community composition, structure and stability. Introduction to forest ecosystem productivity. History and application of successional theory. Prerequisite: basic ecology course or permission of instructor. Offered: A.

CFR 502 Data Collection, Analysis, and Presentation (3) *Ewing* Design of scientific experiments, collection of data, and use of computers to store, analyze and present data. Limited by equipment availability to 8 students; Urban Horticulture students have priority. Offered: Sp.

CFR 503 Current Issues in Urban Horticulture (1, max. 10) Critical evaluation and discussion of published research in urban horticulture and restoration. Students and faculty present and discuss research methods and questions from current literature. Offered: AWSp.

CFR 504 Research Processes in Forest Resources (4) *Lee* Comprehensive survey of research processes for entering graduate students. Diagnostic and prescriptive evaluation of student research capabilities. Problem and hypothesis formulation, study design, multi-method strategies for gathering and analyzing data, and interpretation and presentation of results. Prerequisite: graduate standing. Offered: A.

CFR 505 Introduction to Pulp and Paper Technology (3) *Hodgson, McKean, Gustafson* Introduction to pulp and paper technology for PSE graduate students who do not have a prior background in pulp and paper. Broad overview of pulp and paper technology and the pulp and paper industry. Offered: concurrently with PSE 201; A.

CFR 507 Soils and Land Use Problems (4) *Harrison* Environmental concerns of soils; how soil properties control potential and reasonable

possibilities of land use. Includes factors controlling soil stability, hydrology, fertility, and movement of pollutants. Field trip oriented with weekly activity summaries. Students also conduct field trips to soil-use problem sites.

CFR 509 Natural Resource Issues: Unspoken Basics (3) Natural resource issues emerge from interactions between humans and their biophysical world. Understanding resource problems and solutions requires integration of numerous areas of knowledge and methods of discovery. Objectives include exposure to, and development of, fundamental issues and skills essential for natural resource professionals. Offered: A.

CFR 511 Advanced Forest Soil Microbiology (5) *Edmonds* Detailed examination of microbial processes in forest ecosystems; types of organisms, biomass, decomposition and nutrient cycling, microbial transformations of N, impacts of management-clear-cutting, fertilization, pesticide addition. Graduate project required. Prerequisite: general biology, basic soils or permission of instructor. Offered: even years; A.

CFR 512 Biogeochemical Cycling in Soils and Forest Ecosystems (3) *Zabowski* Elemental cycles in forests and soils. Fundamentals of processes involved in cycling are addressed along with alterations resulting from environment, vegetation, and soil types. Consideration of cycles of nutrients, metals, and other elements. Weekly discussion section reviews literature on biogeochemical cycling. Prerequisite: one soils course or permission of instructor. Offered: even years; W.

CFR 513 Advanced Soil Genesis and Classification (5) *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and field trips illustrate properties and processes of forest and grassland soils in Washington. Requires two weekend field trips and a graduate project. Prerequisite: ESC 210 or permission of instructor. Offered: even years; Sp.

CFR 514 Advanced Forest Soil Fertility and Chemistry (4) *Harrison* Chemical properties of soil, nutrient and toxic elements; supply, retention, and loss of nutrients in soils; utilization of geochemical and ecosystem models such as GEOCHEM, MAGIC, TRICLE-DOWN, and ILWAS in developing a quantitative understand-

ing of the chemical function of forest ecosystems. Prerequisite: general chemistry and geology of soils. Offered: even years; Sp.

CFR 515 Advanced Soil and Plant Analysis (3) *Harrison* Plants and animals must acquire nutrient elements from their environment. Quantifying the composition of samples is the first step in understanding the processes in natural and manmade systems. Sampling, handling, preparation, storage, and analysis stressed. Prerequisite: one botany or plant science course, instrumental analysis, soils. Offered: even years; Sp.

CFR 519 Conducting and Publishing an Industry Performance Review (3, max. 12) *Paun* Focuses on the concepts of accounting, finance, and financial statement analysis; techniques for analyzing firm performance; and conducting competitor analyses. Conduct in-depth, comparative performance analyses of U.S. and Canadian paper firms and publish the findings as a peer-reviewed manuscript in a journal. Offered: WSp.

CFR 520 Geographic Information Systems in Forest Resources (5) Applications of GIS technology to forest science and management. Fundamental of GIS systems: data sources, preprocessing, map analysis, output; remote sensing as a source of GIS data, image analysis, and classification. Emphasis on GIS as a source of management and technical information requests. Offered: AW.

CFR 521 Current Topics in Forest Resources (2-5, max. 10) Critical evaluation and discussion of published research in the broad field of forest resources. Topics and requirements vary. Offered: AWSp.

CFR 525 Advanced Wildland Hydrology (4) *Bolton* Advanced treatment of hydrologic cycle and basic hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Graduate focus on a detailed field or modeling hydrologic analysis. Offered: W.

CFR 526 Seminar in Advanced Silviculture (3) *Ford* Seminar on current and emerging silvicultural issues and underlying biological principles. Topics include: stand management to enhance wildlife, biodiversity and high productivity in sub-tropical and tropical regions; computer

simulation of stand growth; adaptation to changes in management objectives; soil conditions and productivity during stand rotation; and minimizing effects of catastrophic disruption. Prerequisite: ESRM 428.

CFR 527 Ecosystems Seminar (1) *Sprugel* Discussion by invited speakers on current research related to ecosystems. Credit/no credit only. Offered: A.

CFR 528 International Forestry (3) *Gara, Greulich* Discussion on biological, social, and economic basis linked with forest practices in the world. Focuses on examples of how forests and renewable resources are both exploited and managed, with thoughts on how these resources can be sustainability managed. Emphasizes group presentations and seminar style discussion. Offered: even years; W.

CFR 529 Topics in Streamside Studies (1) Discussion by invited speakers on current research related to streamside studies. Credit/no credit only. Offered: jointly with FISH 529; AWSp.

CFR 535 Fire Ecology (3) *Agee* Fire regime concept as applied to fire ecology. Methodology for fire history research. History and function of forest fire in western United States with emphasis on Pacific Northwest. One weekend field trip. Prerequisite: permission of instructor. Offered: A.

CFR 545 Principles of Forest Entomology (3) *Gara* Historical perspective of the discipline, introduction to general entomology and taxonomy, forest insect ecology, integrated pest management concepts for defoliators, bark beetles, wood borers, and urban forestry pests. Prerequisite: general biology, botany, zoology or permission of instructor.

CFR 547 Stream and River Ecology (5) *Naiman* Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Recommended: general ecology, forestry-fisheries interactions. Offered: jointly with FISH 547; Sp.

CFR 549 Urban Horticulture Seminar (1, max. 6) Discussion by invited speakers on current topics in urban horticulture. Credit/no credit only. Offered: A.

CFR 550 Graduate Seminar (2-5, max. 10) *Eastin, Paun* Graduate seminar to evaluate and discuss current research topics in forest resources. Topics and requirements vary. Offered: AWSp.

CFR 554 Wildlife Seminar (1-2, max. 10) *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Prerequisite: permission of instructor. Offered: AWSp.

CFR 561 Public Presentation in Urban Horticulture (2) *Wott* Students learn to make public presentations in scientific, professional, and popular contexts and to interpret technical information for professional and lay audiences. Support materials, such as audiovisuals and graphics are discussed. Offered: W.

CFR 564 Advanced Forest Biometry (3/5) *Turnblom* Classical problems in analysis of forest populations and growth theory, and principles of

parametric analysis and estimation processes in forest biometry. Offered: odd years; A.

CFR 570 Seminar on Environmental Sociology (3) *Lee* Perspectives on environmental sociology, with emphasis on the social construction of environmental problems. European and American schools of thought and their implications for environmental policy. Examination of global and regional issues in the context of risk society. Offered: jointly with SOC 570; A.

CFR 571 Resource Policy and Administration (5) Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Consideration of implications for both policy and management. Students develop a study design for course project. Offered: jointly with PB AF 592.

CFR 573 Forest Environmental Resource Planning (3) *Bradley* Origins and evolution of environmental planning in the forest environment. Discussion of the planning process and methodologies for environmental management and planning; selected case studies of environmental resource plans. Prerequisite: graduate standing. Offered: even years; A.

CFR 574 Problem Analysis in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: A.

CFR 575 Applied Theory and Methods in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: CFR 574 or permission of instructor. Offered: W.

CFR 576 Research in Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised Objectives and Methods sections of interdisciplinary project and present a draft Results section. Prerequisite: CFR 574, CFR 575. Offered: Sp.

CFR 577 Global Forest Resource and Environmental Markets (3) *Perez-Garcia* Economic analysis of global forest resource markets. Models of timber supply and international trade. Linkages to environmental resources including carbon, biodiversity, and climate change. Offered: Sp.

CFR 578 Paper Science and Engineering Seminar (1, max. 6) Discussion of current topics in the science and technology of pulp and paper production, including wood and polymer chemistry. Offered: ASp.

CFR 580 Advanced Urban Ecology (5) *Alberti, Bradley, Hill, Marzluff, Paun, ZumBrunnen* Discussion of current and important theoretical

and empirical papers in urban ecology. Students continue to research interdisciplinary urban ecology projects while developing publishable manuscripts and oral presentations. Offered: jointly with GEOG 588, URBDP 548. Offered: AWSp.

CFR 590 Graduate Studies (1-5, max. 5) Study in fields for which there is not sufficient demand to warrant the organization of regular courses. Offered: AWSpS.

CFR 591 Seminar in Resource Policy and Management (1) *Ryan* Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with PB AF 591; A.

CFR 592 Environmental Policy Processes (3) *Cullen* Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with PB AF 590.

CFR 595 Graduate Teaching Practicum (1-5, max. 5) Principles of teaching and learning applied to undergraduate instruction in Ecosystem Science and Conservation. Development, delivery, and evaluation of lectures and homework assignments. Graduate teaching experience for ESC students only. Credit/no credit only. Offered: AWSp.

CFR 600 Independent Study or Research (*) Offered: AWSpS.

CFR 601 Graduate Internship in Forest Resources (3-9, max. 9) Graduate internship under the supervision of a college faculty member. Credit/no credit only. Offered: AWSpS.

CFR 700 Master's Thesis (*) Offered: AWSpS.

CFR 800 Doctoral Dissertation (*) Offered: AWSpS.

Environmental Sciences and Resource Management

ESRM 100 Introduction to Environmental Science (5) *I&S/NW Harrison* Covers the importance of the environment in society with particular emphasis on worldwide distribution and uses of resources, the role of natural and man-made environments, and causes of environmental degradation. Introduces ethics of conservation and recycling. Prerequisite: Cannot be taken for credit if ESC 110 already taken. Offered: jointly with ENVIR 110; AWSpS.

ESRM 101 Forests and Society (5) *I&S/NW Gara, Vogt* Survey course covering forest ecosystems of the world, history of forestry and forest conservation, how forest ecosystems function, wildlife in forests, environmental issues in forestry, forest management, economics and products, and new approaches to forest management. Open to majors and nonmajors. Offered: AWSpS.

ESRM 150 Wildlife in the Modern World (5) *I&S/NW Manuwal* Covers major wildlife conservation issues in North America. Some

global issues are also treated. Examples of topics include the conservation of large predators, effects of toxic chemicals on wildlife, old-growth wildlife, conservation of marine wildlife, recovery of the bald eagle, and gray wolf. Offered: A.

ESRM 210 Introductory Soils (4) NW *Zabowski* Physical, chemical, and biological properties that affect distribution and use patterns of this important ecosystem component. Includes soil morphology and genesis, plant nutrition and nutrient cycling, soil water, microbiology, and application of soil properties to environmental concerns. One Saturday field trip. Offered: A.

ESRM 250 Introduction to Geographic Information Systems in Forest Resources (5) NW, QSR Applications of GIS technology to forest science and management. Fundamentals of GIS systems: data sources, preprocessing, map analysis, output; remote sensing as a source of GIS data, image analysis, and classification. Emphasis on GIS as a source of management and technical information requests. Offered: AW.

ESRM 255 Wildlife and Society (5) I&S/NW *Manuwal* Covers ecological processes, wildlife habitats, conservation theory, and historical as well as contemporary issues in wildlife conservation. Offered: W.

ESRM 301 Maintaining Nature in an Urban and Urbanizing World (5) I&S/NW The conservation, restoration, and management of nature in highly human impacted environments present unique challenges. Teams of students work on real Pacific Northwest problems, with stakeholders and experts to understand patterns, processes, and drivers of these systems. Prerequisite: either BIOL 162 or BIOL 200. Offered: W.

ESRM 302 Sustainability in Production Lands (5) I&S/NW Covers the role of farming, forestry, grazing, dams, water extraction, fishing, and their ecological and environmental impacts, and the remediation and restoration of their impacts. Utilizes field trips, studios, and problem-solving exercises to understand, integrate, and generalize processes and issues across diverse production systems. Prerequisite: either BIOL 162 or BIOL 200. Offered: Sp.

ESRM 303 Preserving and Conserving Wildlands (5) I&S/NW The stewardship of pristine terrestrial environments is of great importance and contention. Teams of students work with stakeholders and experts on real Pacific Northwest issues (e.g., pollution, invasive organisms, mining, burning, grazing, logging, hunting, skiing) to understand patterns, structure, processes, and drivers of these environments. Prerequisite: either BIOL 162 or BIOL 200. Offered: A.

ESRM 304 Environmental and Resource Assessment (5) I&S/NW, QSR The processes of measuring, monitoring, and assessment; illustrated in diverse environmental and resource case studies. Explores the scientific method, hypothesis testing, sampling, and experimental designs, the role of questionnaires and polling techniques, remote sensing techniques, and population measurements. Prerequisite: either Q SCI 381 or STAT 311, either of which may be taken concurrently. Offered: A.

ESRM 310 Trees in Our Environment (5) NW *Brubaker* Explores tree form and function from

perspectives of dendrology, ecology, and adaptation in wildland and urban environments. Lectures, projects, and field investigations introduce 50-60 trees of the Pacific Northwest. Acquire skills to increase knowledge of trees. Prerequisite: either BIOL 162 or BIOL 220. Offered: Sp.

ESRM 311 Soils and Land Use (3) NW *Harrison* Intended for students concerned with environmental problems in the Puget Sound basin; also for those who intend to become professionally involved in land-planning decisions. Focus is on the significance of soils in understanding environmental problems and in promoting intelligent land-use decisions. Basic concepts of soil systems are presented, stressing those aspects important in making land-planning decisions. Offered: W.

ESRM 315 Natural Resource Issues: Old-Growth and Forest Management (5) I&S/NW *Franklin* Biological and social elements of current conflicts, especially those associated with old-growth and its disposition. Ecology of Pacific Northwest forests and landscapes, history of forest practices, application of emerging science, proposed alternative practices and policies, including analysis of current proposal and its predecessors and successors. Open to majors and nonmajors. Offered: Sp.

ESRM 320 Marketing and Human Resource Management from an Environmental Perspective (5) I&S/NW *Paun* Introduction to business concepts relating to marketing, human resource management, small businesses and entrepreneurship, and economics in the context of environmental resource management. Offered: A, S.

ESRM 321 Finance and Accounting from An Environmental Perspective (5) I&S/NW *Paun* Introduction to business concepts relating to finance, accounting, and international business in the context of environmental resource management. Offered: WS.

ESRM 323 Silviculture (5) NW Silviculture techniques, including nursery practices, clear-cutting, seed trees, shelterwood, selection cutting, site preparation, regeneration methods, thinning, fertilization, chemicals, and regional silviculture in the Northeast, Southeast, Midwest, Rocky Mountains, California, Pacific Northwest, and Alaska. Multiple-use field trips. Offered: Sp.

ESRM 326 Wildlife Habitat and Silviculture (3) NW *Agee* Principles of wildlife habitat in forest and range ecosystems. Silvicultural principles applicable to wildlife conservation and management. Prerequisite: either ESRM 302 or ESRM 303. Offered: Sp.

ESRM 328 Forestry-Fisheries Interactions (4) NW Characteristics of forestry-fisheries interactions in terrestrial and aquatic landscapes. Effects of changes in landforms on forest and aquatic communities. River basin and watershed features. Forest stand dynamics, forest hydrology, fish and wildlife histories and behavior. Resource conflicts and resolution. Offered: jointly with FISH 328; W.

ESRM 331 Landscape Plant Recognition (3) NW *Reichard* Field recognition of important groups of woody landscape plants, emphasizing diversity at the genus and family levels. Cultivated plant nomenclature. Plant descriptive characters evident in the field with eye and hand lens. Hardiness and landscape applications.

Recommended: either BIOL 117 or BOTANY 113. Offered: jointly with BIOL 331; SpS.

ESRM 350 Wildlife Biology and Conservation (5) NW Wildlife ecology and population biology, and interrelationships between wild animals and humans, including encouragement of wildlife population growth and productivity, control of pest populations, and preservation of endangered species with emphasis on forest environments and forest faunas. Open to nonmajors. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, BIOL 202, BIOL 203, or BIOL 220, any of which may be taken concurrently. Offered: W.

ESRM 351 Wildlife Research Techniques (8) NW *Agee, Manuwal, West* Scientific approaches to the field study of wildlife populations and habitat, including basic considerations in experimental design and development of scientific papers. Emphasis is on direct experience with current field techniques used in the study of vertebrate populations and habitat. Prerequisite: either ESRM 303, ESRM 350, or ESRM 450. Offered: Sp.

ESRM 362 Introduction to Restoration Ecology (5) I&S/NW *Ewing* An introduction to ecological restoration of damaged ecosystems. Examines the philosophical base of restoration as well as the social, biological and political forces that impact the success of any restoration project. Includes lectures, readings, case studies and field trips. Offered: jointly with ENVIR 362; A.

ESRM 368 Natural Resource Measurements (4) NW *Turnblom* Introduction to principles of measurement, basic field measurement skills, measurement of vegetation, including stand examination, timber cruising, size, weight, volume and biomass of trees, and stream flow. Laboratories include field exercises on sampling techniques for trees and lesser vegetation and linear regression modeling to predict quantities from basic measurements. Prerequisite: either IND E 315 or Q SCI 381; recommended ESRM 304. Offered: W.

ESRM 371 Environmental Sociology (5) I&S/NW *Lee* Social processes by which environmental conditions are transformed into environmental problems; scientific claims, popularization of science, issue-framing, problem-amplification, economic opportunism, and institutional sponsorship. Examination of social constructs such as ecosystem, community, and free-market economy. Use of human ecology to assess whether the current framing of environmental problems promotes ecological adaptability. Offered: jointly with SOC 379/ENVIR 379; WS.

ESRM 381 Management of Wildland Recreation and Amenities (3) NW *Lee* Introduction and overview of wildland recreation and amenities management. Agency history and objectives explored along with integration of recreation with other land uses. Water, forestry, wildlife, and wilderness resources for recreational uses discussed along with role of private enterprise in recreation and amenities. Topics of current and local interest. Offered: W.

ESRM 399 Undergraduate Internship (1-5, max. 15) Internship experience with a public agency or private company, supervised and approved by a faculty member. Preparation of professional report reflecting on the experience is required. Credit/no credit only. Offered: AWSpS.

ESRM 400 Natural Resource Conflict Management (3) I&S/NW *Ryan* Introduction to

the causes, dynamics, and consequences of natural resource conflicts as well as the range of procedural interventions used to manage conflict. Specific cases of environmental conflict and alternative dispute resolution procedures are examined. Emphasis on developing skills to effectively analyze, manage, and resolve natural resource conflicts. Offered: W.

ESRM 401 Spring Comes to the Cascades (3) NW Examines the interaction between forests, environment and growth at three locations in the Cascades, from lowlands to alpine. Field trips and associate observations are linked to classroom or group project activities and are used to understand a number of ecological, physiological and meteorological concepts.

ESRM 402 Curation and Education in Public Gardens (3) I&S/NW *Wott* Techniques of curatorial practice relevant to living collections of plants, including documentation, policies, conservation, and display. Aspects of establishing and implementation of a public horticulture program including assessment, program tools and methods, and funding in a public environment. Offered: even years; A.

ESRM 403 Forest and Economic Development in the Developing World (4) NW Examines the relationship between forests and economic development in tropical countries. Topics include the role of population growth, poverty, land tenure, and international trade on forest use as well as theories of economic development. Case examples of forest-based economic development in different countries and regions. Offered: Sp.

ESRM 404 Forest Science Inquiry for Teachers (5) Lee Inquiry-based scientific methods for K-12 instruction; asking how and why questions; stating answerable questions; forming hypothesis to answer questions; testing hypothesis by making observations, making measurements, and conducting experiments; displaying results. Writing curriculum plans to implement district and state requirements. Offered: S.

ESRM 410 Forest Soils and Site Productivity (5) NW *Harrison* Considers unique properties and processes occurring in forest soils throughout the world with emphasis on soils of Pacific Northwest and aspects of forest soils that affect productivity. Two all-day Saturday field trips and one Saturday-Sunday field trip required. Recommended: ESRM 210. Offered: odd years; A.

ESRM 411 Plant Propagation: Principles, and Practice (3) NW *Wott* Science and practice of plant propagation including sexual (seed) and asexual (cutting, layering, grafting) propagation. Includes discussion of physiological effects, methodology and laboratory exercises. Wide variety of plants covered. Intended for majors in urban horticulture and urban forestry and others interested in reproducing landscape plants. Recommended: 10 credits of introductory biology or botany, or equivalent. Offered: Sp.

ESRM 412 Native Plant Production (3) NW *Reichard, Wott* Advanced plant propagation techniques, emphasizing native plants, propagation for restoration projects, and unique problems associated with providing appropriate plant material for restoration or conservation purposes. Emphasizes greenhouse and fieldwork, and includes lectures, field trips, and a class project. Recommended: ESRM 411, which may be taken concurrently.

ESRM 413 Soil Genesis and Classification (5) NW *Zabowski* Soil formation, morphology, classification, and relationship to the environment. Labs and weekend field trips illustrate properties and processes of forest and grassland soils in Washington. Recommended: ESRM 210. Offered: even years; Sp.

ESRM 414 Forest Soil Fertility and Chemistry (3) NW *Harrison* Tree growth depends, in part, on the interaction between chemical and biological activities within a given soil: the biological and chemical parameters that influence the growth; soil solution chemistry and surface reactions; reactions and processes that control essential plant nutrient levels and forms in soil solutions. Recommended: ESRM 210. Offered: even years; Sp.

ESRM 415 Biology, Ecology, and Management of Plant Invasions (5) NW *Reichard* Explores how biological invasions are one of the most serious threats to the preservation of biodiversity worldwide. Explores the vectors which move plants and their pests, the biology and impacts of the invasive species, and management and policy approaches. Prerequisite: one of the following: BIOL 162, BIOL 220, BIOL 333, BIOL 471, BIOL 472, ESRM 401, ESRM 472, or ESRM 473. Offered: A, odd years.

ESRM 416 Field Survey of Wildland Soils (3) NW *Harrison, Zabowski* Study of soils in remote sites about which little information is available. Focus is field trip in Cascade Mountains just north of Glacier Peak with prior study of hiking area, soil and ecosystem changes, and wilderness use. Offered: S.

ESRM 420 Wildland Fire Management (5) NW *Agee* Principles of wildland fire behavior, ecology, and management. Weather, fuels, and topography effects on fire behavior. Forest structure influence on historical and current fire ecology. Principles of firesafe forests. Management issues of fire control and use in wilderness, multiple-use forest, and the wildland-urban interface. Offered: A.

ESRM 422 Marketing of Forest Products (3) I&S/NW *Eastin* Introduction to forest products marketing in North America. Examines products marketing, industry structure, and strategic management issues utilizing marketing concepts. Topics include product management, distribution channels, strategic industry analysis, and marketing research techniques. Case studies used to understand forest products industry decision making. Offered: W.

ESRM 423 International Marketing of Forest Products (3) I&S/NW *Roos* Introduction to international marketing concepts and their application to forest products. Analysis of forest products trade patterns, resource base changes, policy, industrial policies, and environmental concerns. Discussion of market distorting practices including log export bans and tariff and non-tariff barriers. Offered: Sp.

ESRM 425 Ecosystem Management (5) NW *Franklin* Scientific and social basis for ecological forestry. Forest practices to achieve integrated environmental and economic goals based upon material models of disturbance and stand development including alternative harvesting methods; adaptive management and monitoring; certification and global issues. Offered: A.

ESRM 426 Wildland Hydrology (4) NW *Bolton* Introduction to the hydrologic cycle and basic

hydrologic methods as applied to wildlands. Effects of forest management activities on hydrologic processes. Offered: W.

ESRM 428 Principles of Silviculture and Their Application (5) NW *Ford* Focuses on the biology of major tree species in the PNW and their use in silviculture, stand development in plantation forest systems and its relationship to forest yield, the advantages and limitations of plantation silviculture relating to specific biotic, abiotic and economic conditions and management for objectives other than time yield. Prerequisite: ESRM 323.

ESRM 429 Seminar in Streamside Studies (1, max. 6) NW *Steinemann* Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Credit/no credit only. Offered: jointly with FISH 429; AWSp.

ESRM 430 Aerial Photos/Remote Sensing Natural Resources (3) NW *Schreuder* Principles of photogrammetry, interpretation, and remote sensing; and their application to management of natural resources and wildlands. Uses for watersheds, forest resources, wildlife, point and nonpoint pollution, land-use planning, and outdoor recreation. Offered: Sp.

ESRM 435 Forest Entomology (3) NW *Gara* Introduction to general entomology, characteristics, life histories, ecological relations, prevention, and control of forest insects. Offered: A.

ESRM 436 Laboratory in Forest Entomology (2) NW *Gara* Introduction to the insect orders; identification of forest insects and their damage. One field trip to study insect problems required. Offered: A.

ESRM 441 Landscape Ecology (5) NW *Franklin* Basic landscape ecology concepts, including patches, corridors, networks, spatial dynamics; island biogeographic principles; landscape analysis methods; landscape models. Applications of landscape ecology in resources management (e.g., cumulative effects, cutting, patterns, anadromous fisheries, management of wildlife populations, and open-space planning). Recommended: ESRM 326. Offered: W.

ESRM 444 Forest Ecosystems Protection: Insects and Diseases (5) Edmonds, Gara Examines the effects of insects and diseases on wildland and managed forest ecosystems: defoliators, bark beetles, wood boring insects, abiotic and biotic diseases, insects and diseases in intensively managed forests, principles of insect and disease management. Prerequisite: either ESRM 301, 302 or 303 (can be taken concurrently). Offered: odd years; Sp.

ESRM 450 Wildlife Ecology and Conservation (5) NW *Marzluff* Covers advanced principles of wildlife ecology such as habitat selection, population viability, and landscape ecology, and illustrates how they apply to wildlife conservation problems with terrestrial, aquatic, and marine wildlife. Students must share costs of field trips. Prerequisite: either ESC 350 or ESRM 350; either CFR 250 or ESRM 250; recommended: introductory statistics. Offered: W.

ESRM 451 Urban Plant Protection (5) NW *Gara* Working knowledge on insects and diseases of plants growing in the urban environment. Emphasis placed on pest and damage recognition, control methods, and integrated pest management systems. Offered: even years; Sp.

ESRM 452 Field Ornithology (3) NW *Manuwal* Students learn field identification skills and are introduced to field methodologies through required indoor labs, field trips, and field exercises. Exercises include study of survey techniques, feeding ecology, and behavior. Students are required to share field trip costs. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, BIOL 202, BIOL 203, or BIOL 220, any of which may be taken concurrently. Offered: odd years; A.

ESRM 453 Biology and Conservation of Mammals (3) NW *West* Introduction to mammals of the world: mammalian evolution, taxonomy, morphology, reproduction, population biology, ecology, and conservation. Prerequisite: ESC 350; recommended: concurrent registration in ESC 454. Offered: irregularly.

ESRM 454 Biology and Conservation of Mammals Laboratory (3) NW *West* Identification and natural history of mammals of the Pacific Northwest. Laboratory work on morphology, taxonomy, and natural history; fieldwork on natural history and sampling methods. Two weekend field trips required; students share travel costs. Prerequisite: ESC 350; recommended: concurrent registration in ESC 453. Offered: irregularly.

ESRM 455 Wildlife Seminar (1, max. 4) NW *Manuwal, West* Discussion of current research and application in wildlife biology and conservation. Credit/no credit only. Offered: A/WSp.

ESRM 456 Biology and Conservation of Birds (3) NW *Manuwal* Major principles of natural history, avian reproductive biology, population ecology, and national and international conservation strategies for both hunted and unhunted birds. Emphasis on western United States. Prerequisite: either BIOL 102, BIOL 162, BIOL 180, BIOL 202, BIOL 203, or BIOL 220, any of which may be taken concurrently. Offered: odd years; A.

ESRM 457 Fish and Wildlife Toxicology (3/5) NW Overview of fish/wildlife toxicology: history of the field; regulations; methods used to assess risks contaminants pose to fish/wildlife; classes of contaminants and their direct, sublethal and indirect effects; and contemporary threats of contaminants to fish/wildlife, their habitats and prey. Includes laboratory. Offered: jointly with FISH 455; W.

ESRM 458 Management of Endangered, Threatened, and Sensitive Species (5) NW *Marzluff* Biological underpinnings and political realities of endangered species management, including: legal issues, recovery teams, citizen rights, extinction, rarity, proactive management, captive propagation, reintroduction, species endangered in the Pacific Northwest. Students revise endangered species recovery plans. Offered: A.

ESRM 459 Wildlife Conservation in Northwest Ecosystems (3) NW *Agee, Manuwal, West* Extended field course offers Wildlife Science students personal interactions with wildlife managers and wildlife populations in strategic public and private lands in the northwestern United States and southern Canada. Students will share costs of trip. Offered when there is sufficient student demand. Prerequisite: ESRM 350; may not be repeated. Offered: Sp.

ESRM 460 Institutionalizing Sustainable Ecological Practices. (5) I&S/NW *Lee* Introduction to how sustainability and conserva-

tion are possible. Case studies of successful institutionalization of sustainable ecological functions, including curbside and biosolids recycling, ecological restoration, bioremediation, sustainable wood production, and product certification. Emphasis on individual student projects. Offered: jointly with ENVIR 460; Sp.

ESRM 461 Forest Management and Economics II (4) I&S/NW *Greulich* Basic concepts of timber harvest scheduling, sustained-yield models, contemporary analytical techniques, timber supply, and forest product markets. Offered: W.

ESRM 462 Restoration Ecology Capstone: Introduction (2) NW First of a three-course capstone sequence in restoration ecology. Students review and assess project plans and installations. Class meets with members of previous capstone classes to review their projects. Offered: jointly with ENVIR/TESC/BES 462. Offered: A.

ESRM 463 Restoration Ecology Capstone: Proposal and Plan (3) NW Student teams prepare proposals in response to requests for proposals (RFPs) from actual clients. Clients may be governments, non-profit organizations, and others. Upon acceptance of the proposal, teams prepare restoration plans. Prerequisite: ESRM 462. Offered: jointly with ENVIR/TESC/BES 463. Offered: W.

ESRM 464 Restoration Ecology Capstone: Field Site Restoration (5) NW Teams take a restoration plan developed in ESRM 463 and complete the installation. Team participation may include supervision of volunteers. Teams prepare management guidelines for the client and conduct a training class for their use. Prerequisite: ESRM 463. Offered: jointly with ENVIR/TESC/BES 464. Offered: Sp.

ESRM 465 Economics of Conservation (3) I&S/NW *Perez-Garcia* Economic principles and their use in the analysis of contemporary conservation problems. Particular emphasis directed toward the conservation of forest resources in the Pacific Northwest and related policy issues. Offered: Sp.

ESRM 470 Natural Resource Policy and Planning (5) I&S/NW *Bradley, Ryan* Introduction to and analysis of environmental policy-making processes, with a focus on forest and land policy and law. Use of policy models to examine the interaction of agencies, interest groups, Congress, and the courts in the legislative process. Policy implementation, evaluation, and change are also addressed. Offered: A.

ESRM 471 Urban Forest Landscapes (5) NW *Bradley* Comprehensive view of urban forest and urban forest landscapes. Includes close examination of factors that differentiate urban forest landscapes along the urban to wildland gradient. Compare legal, social, political, administrative, physical, and biological variations. Offered: Sp.

ESRM 472 Wetland Ecology and Management (5) NW *Ewing* Wetland types and functions, global and North American distribution, wetland plant types, soil chemistry. The influence of stresses on wetland composition and form. Autecology of wetland plants; response to and detection of stresses. Impacts of urbanization; management techniques. Recommended: either BIOL 471, BIOL 472, BOTANY 354, or BOTANY 371. Offered: A.

ESRM 473 Principles of Ecological Restoration (5) NW *Ewing* Philosophy of restoration, structural components of ecosystem degradation, analysis of restoration projects and methods, and an ecosystem by ecosystem review of how systems are restored. An ecology courses that emphasizes applied scientific knowledge of ecosystems. Recommended: plant ecology, plant identification, horticulture, landscape ecology coursework. Offered: W.

ESRM 474 Problem Analysis in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Paun, Ryan, ZumBrunnen* Investigates pressing local issues in urban ecology and develops each into a researchable project proposal. Examines and evaluates how different disciplines study environmental issues, explores criteria for conducting and evaluating quality research, develops skills in problem formulation, and sharpens proposal writing skills. Offered: jointly with ENVIR 486/GEOG 486/URBDP 443; A.

ESRM 475 Applied Theory and Methods in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Paun, Ryan, ZumBrunnen* Discusses broad perspectives in urban ecology and how to analyze data relevant to urban ecology problems. Students write objectives and methods for a selected urban ecology problem that critiques different methodological approaches and reviews/synthesizes literature. Prerequisite: CFR 474/ENVIR 496/GEOG 486. Offered: jointly with ENVIR 487/GEOG 487. Offered: W.

ESRM 476 Research in Urban Ecology (5) I&S/NW *Alberti, Bradley, Hill, Marzluff, Paun, Ryan, ZumBrunnen* Teams analyze, present, and begin to interpret data that is relevant to addressing issues in urban ecology. Write and orally present revised objectives and methods sections of interdisciplinary project and present results section. Prerequisite: CFR 475/GEOG 487/ENVIR 487. Offered: jointly with GEOG 488/ENVIR 488; Sp.

ESRM 477 Wetland Restoration (5) NW *Ewing* A Web-delivered, self-paced course covering wetland science, restoration ecology, freshwater restoration, coastal restoration, monitoring/maintenance, and case histories. Completion of extensive readings, assignment and test required for each module. Prerequisite: either BIOL 102, BIOL 180, or BIOL 203; recommended: either ESRM 473, ESRM 472, BOTANY 354, BOTANY 456, BIOL 471, or BIOL 472. Offered: irregularly.

ESRM 480 Selection and Management of Landscape Plant (5) NW Principles of plant selection and management in urban and modified environments. Site analysis and preparation; physiological basis for plant selection; techniques for successful plant installation and aftercare; plant performance evaluation; long-term management and plant health care. Group and individual projects. Prerequisite: either ESRM 210 or ESRM 311; recommended: either BIOL 116 or BIOL 117. Offered: A.

ESRM 481 Field Practicum in Plant Selection and Management (2) NW Practical application of plant selection and management in urban and modified environments. Site analysis and preparation; evaluation of nurseries; techniques for successful plant installation and aftercare; plant performance evaluation; plant health care assessment. Group project. Prerequisite: ESRM 480, which may be taken concurrently. Offered: A.

ESRM 489 Foreign Study (1-5, max. 15) Individual foreign study of topics for which there

is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

ESRM 490 Special Topics (1-5, max. 15)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

ESRM 494 Senior Thesis Proposal (5)

Selection of a thesis topic, literature review, and preparation of a formal senior thesis proposal. Students select a faculty advisor to assist them in the proposal writing process. Regular or Honors credit. Offered: AWSpS.

ESRM 495 Senior Project (5) Individual study of an environmental science and resource management problem under direction of a faculty member. Requires a written project report. Generally taken in last year of residence. Offered: AWSpS.

ESRM 496 Senior Thesis (5) Statistical analysis and presentation of research results and discussion of results in a thesis paper. Students work with faculty advisors to complete field or laboratory research and then prepare the senior thesis. Offered: AWSpS.

ESRM 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

Paper Science and Engineering

PSE 102 Paper, Society, and the Environment (5) I&S/NW *Gustafson* Types of products and patterns of use. Overview of manufacturing processes in terms of raw material, costs, world trade and consumer requirements. Environmental implications of manufacturing, recycling, and disposal of paper and its byproducts. Societal and environmental costs of substituting petroleum-based or nonwood raw materials in paper products. Offered: A.

PSE 104 Products and Energy from Renewable Resources (5) I&S/NW Introduction to the structure, composition, and availability of renewable resources. Conversion of these materials into solid products, energy, and useful chemicals. Particular attention to the production of fiber (paper/board), fuels (ethanol/aromatics), and specialty chemicals (biopolymers, medicines, etc.). Includes weekly laboratory session. Offered: Sp.

PSE 201 Introduction to Pulp and Paper Technology (3) NW *Gustafson, Hodgson, McKean* Broad overview of the science and technology of producing pulp and paper. Introduction of the PSE major course sequence and various career options. Examination of Pacific Northwest pulp and paper production facilities. Offered: A.

PSE 202 Pulp and Paper Lab and Field Studies (1) NW *Gustafson, Hodgson, McKean* Laboratory and field trip studies in pulp and paper technology. Visits to local forest product manufacturing facilities. Required for PSE majors. Credit/no credit only. Offered: A.

PSE 211 Creativity and Society (5) VLPA, I&S *Allan* Explores the nature of creativity and innovation in U.S. and other societies. Investigates the processes of thinking and techniques of idea generation in fields such as

art, music, science, engineering and medicine. Offered: A.

PSE 248 Paper Properties (4) NW *Johnson*

Acquaints students with raw material characteristics, physical and mechanical concepts, nomenclature, and procedures related to evaluating paper and paperboard product properties. Emphasizes structural, optical, mechanical, and moisture related properties. Prerequisite: PSE 201. Offered: W.

PSE 309 Creativity and Innovation (2) VLPA

Allan Understanding creativity and creative thinking; its challenges and dynamics through knowledge, judgment, planning, and observation. Techniques of creative thinking. Design and development of creative games. Computer-aided creative thinking. Creation, protection, and exploitation of a useful idea, including bargaining and negotiations. Offered: jointly with CHEM E 309; Sp.

PSE 399 Undergraduate Internship (1-5, max. 15) Internship experience with a public agency or private company, supervised and approved by a faculty member. Preparation of professional report reflecting on the experience is required. Credit/no credit only. Offered: AWSpS.

PSE 402 Paper Physics (3) NW *Johnson*

Exploration of paper product behavior from a materials science perspective. Fundamental laws of physics, both deterministic and statistical, will be used to explain experimental results. Discusses and analyzes theoretical models to explain paper behavior. Prerequisite: PSE 248; PHYS 121, 122, 123. Offered: A.

PSE 404 Raw Materials for Papermaking (3)

NW McKean, Hodgson Key fiber properties for producing various paper and paperboard products. General effects of fiber length and morphology on sheet properties. Characteristics, processing and use of secondary fiber in paper products. Nonwood pulping and fiber properties. Product characteristics of various paper grades. Prerequisite: PSE 201; PSE 202; PSE 248. Offered: Sp.

PSE 406 Wood Chemistry I (3) NW

Chemistry of cellulose, hemicellulose, and lignin. Pulping and bleaching chemistry of wood. Prerequisite: either CHEM 237 or CHEM 335.

PSE 409 Wood Extractives Chemistry (2) NW

Northey Nature, origin, and occurrence of the extraneous components of wood, their influence on pulp and paper preparation, and their utilization. Prerequisite: either CHEM 237 or CHEM 335.

PSE 450 Paper Science and Engineering

Seminar (1, max. 4) Discussion of current topics in the science and technology of pulp and paper production. Emphasis on employer expectations of students in the paper science industry. Credit/no credit only. Offered: Sp.

PSE 476 Pulping and Bleaching Processes (3)

Gustafson Conversion of wood to mechanical and chemical pulps. Kraft, sulfite, and semi-chemical pulping processes. Chemical recovery systems. Bleaching of mechanical and chemical pulps. Offered: jointly with CHEM E 471; W.

PSE 477 Papermaking Processes (3) McKean

Fiber sources and properties. Secondary fibers. Stock preparation, sheet forming, water removal, finishing. Coating, lamination, and printing. Paper products. Offered: jointly with CHEM E 472; A.

PSE 478 Pulp and Paper Laboratory (2)

Laboratory experiments in chemical and semi-chemical pulping of wood. Bleaching of chemical and high-yield pulps. Physical and chemical characteristics of pulp fibers. Prerequisite: PSE 476. Offered: jointly with CHEM E 473; Sp.

PSE 479 Pulp and Paper Laboratory II (3)

McKean Paper testing, paper additives, flocculation, drainage, retention, heat transfer, and fluid dynamics in papermaking from virgin and recycled raw materials. Prerequisite: PSE 402; PSE 477. Offered: W.

PSE 480 Pulp and Paper Process Control (3)

Gustafson Control of pulp and paper processes. Sensors, actuators, interface equipment, and computer control strategies common to this industry. Prerequisite: PSE 476; PSE 477. Offered: W.

PSE 481 Pulp and Paper Unit Operation (3)

Unit operations of particular interest in the pulp and paper industry in addition to those covered in CHEM E 330 and 340. Prerequisite: CHEM E 340. Offered: W.

PSE 482 Paper Science and Engineering

Design I (3) I&S/NW *Briggs, Gustafson* Basic engineering economics applied to design of pulp and paper facilities. Analysis of engineering alternatives based on use cost analysis and accounting tools. Introduction to process and mill design. Prerequisite: 2.0 in PSE 406; 2.0 in PSE 476; 2.0 in PSE 477. Offered: Sp.

PSE 487 Paper Science and Engineering

Design II (5) Comprehensive design of pulp and paper processes, including: economic feasibility studies; process equipment design, optimization, and control; and overall process integration and layout. Safety and ethics in the design process. Prerequisite: PSE 482, which may be taken concurrently. Offered: Sp.

PSE 488 Polymer Chemistry (3) Allan

Fundamental review of synthetic and natural polymers, including kinetics of formation, molecular weight distributions, and solid-state and solution properties. Prerequisite: either CHEM 237 or CHEM 335. Offered: W.

PSE 489 Foreign Study (1-5, max. 15)

Individual foreign study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

PSE 490 Special Topics (1-5, max. 15)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

PSE 491 Undergraduate Studies (1-5, max. 5)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

PSE 492 Undergraduate Studies (1-5, max. 5)

Individual tutorial study of topics for which there is not sufficient demand to warrant the organization of regular classes. Offered: AWSpS.

PSE 494 Senior Thesis Proposal (5)

Selection of a thesis topic, literature review, and preparation of a formal senior thesis proposal. Students select a faculty advisor to assist them in the proposal writing process. Regular or Honors credit.

PSE 495 Senior Project (5) Individual study of an environmental science and resource

management problem under direction of a faculty member. Requires a written project report. Generally taken in last year of residence. Offered: AWSpS.

PSE 496 Senior Thesis (5) Statistical analysis and presentation of research results and discussion of results in a thesis paper. Students work with faculty advisors to complete field or

laboratory research and then prepare the senior thesis. Offered: AWSpS.

PSE 497 Pulp and Paper Internship (1-2, max. 3) Technical and economic analysis of commercial pulp and paper installations. Structured visits to industrial operations to observe technical aspects of pulp and paper curriculum in practice. Preparation of visitation

reports and analysis in seminar setting. Offered: AWSpS.

PSE 499 Undergraduate Research (1-5, max. 15) Individual research supervised by a faculty member. For advanced students desiring to extend their educational experience. Credit/no credit only. Offered: AWSpS.

The Information School

Informatics

INFO 100 Fluency in Information Technology (5) QSR Introduces skills, concepts, and capabilities necessary to effectively use information technology. Includes logical reasoning, managing complexity, operation of computers and networks, and contemporary applications such as effective Web searching and database manipulation, ethical aspects, and social impacts of information technology. Not available for credit to students who have completed CSE 142 or ENGR 142. Offered: jointly with CSE 100.

INFO 198 Introductory Seminars in Informatics (1-5, max. 13) Selected introductory topics in informatics oriented toward freshman and non-major undergraduates and presented in a seminar format. Topics and content vary to represent the interests of the Information School faculty. Credits do not automatically apply to major/minor requirements.

INFO 220 Information Research Strategies (3/5) I&S Use information technology for research and information problem-solving. Create web sites or other presentations, as well as find, manage, and evaluate information, and learn the ethical and legal constraints on information use. AWSpS.

INFO 221 Information Research Strategies in History (3) I&S Information research and problem solving in the context of history. Focuses on identifying information, need, information seeking, evaluation and presentation, and selection of the appropriate sources. Offered: jointly with HIST 221.

INFO 222 Understanding Photographs as Historic Documents (3) I&S/NW Introduction to understanding how to view and interpret information contained in photographs. Examines the photograph as artifact, intent of the photographer, photographic codes and meanings; how such information is used, misused, and manipulated for various purposes and how to navigate archival institutions in search of photographs. Offered: jointly with INFO 222.

INFO 299 Study Abroad - Informatics (1-5, max. 15) For participants in study abroad program. Specific course content varies. Credits do not automatically apply to major requirements.

INFO 300 Intellectual Foundations of Informatics (5) Information as an object of study, including theories, concepts, and principles of information, information seeking, cognitive processing, knowledge representation and restructuring, and their relationships to physical and intellectual access to information. Development of information systems for storage, organization, and retrieval. Experience in the application of theories, concepts, and principles.

INFO 310 Individual Perspectives on Information Systems (5) I&S Social, cognitive,

behavioral, and contextual aspects of information systems, including human information behavior, interpersonal interaction, and social responses to information technology. Emphasis on well-being and information exchanges as a communicative event. Exposure to experimental and naturalistic methodologies through laboratory assignments and field work.

INFO 311 Organizational, Societal, and Global Perspectives on Information Systems (5) I&S Social, ethical, economic, political, and cross-cultural implications of current and future information systems. Information transfer and use within groups, organizations, and cultures. Focus on organizations as information processors, the new knowledge economy, and national and international information policy, intellectual property, privacy, censorship, and freedom of information.

INFO 320 Information Needs, Searching, and Presentation (5) Introduction to information needs, database and information organization and structure, Web and database searching and browsing, and information presentation. Examination of underlying principles in knowledge representation, indexing, record structures, online search process, search strategies and tactics, assessment of user needs, reference interviewing, post-processing, organization and presentation of information.

INFO 340 Database Management and Information Retrieval (5) NW Theories and models in system-centered approaches to information retrieval and database management. Information retrieval and database management systems include text and multimedia databases, web search engines and digital libraries. Issues in system design, development and evaluation, and tools for searching, retrieval, user interfaces, and usability. Prerequisite: CSE 373.

INFO 341 Computer Networks and Distributed Applications (5) NW Basic concepts of local and wide area computer networking including an overview of services provided by networks, network topologies and hardware, packet switching, client/server architectures, network protocols, and network servers and applications. Also addresses management, security, authentication, and policy issues associated with distributed systems. Prerequisite: CSE 143.

INFO 344 Web Tools and Development (5) Introduction to fundamental web technologies with an emphasis on scripting and programming. Includes both client and server technologies. Examines effective information architecture for Web sites, information presentation on Web pages, privacy policies, and Web security. Prerequisite: CSE 142.

INFO 380 Information Systems Analysis and Management (5) Examines the evolution of how information is defined and managed in order to add value to organizations. Views information management and the CIO as key facilitators in

creating or improving relationships, processes, competitiveness, products, and services.

INFO 414 Information Behavior (5) Advanced study of information behavior. Focus on the user-centered approach and the research literature of human information behavior. Introduces methods for evaluating and translating the results of user behavior studies into the design of information services and systems. Prerequisite: INFO 310.

INFO 419 Special Topics in Social Aspects of Information (1-5, max. 10) Various topics in the social aspects of information. Offered by visitors or resident faculty.

INFO 424 Information Visualization and Aesthetics (5) VLP Examines the visualization of information: the effects of human perception, the aesthetics of information design, the mechanics of visual display, and the semiotics of iconography. Examples may include census, epidemiological, crime, earth satellite, and medical data in the contexts of special computer applications, user populations, and cultures. Prerequisite: CSE 143.

INFO 430 Knowledge Organization and Representation (5) Advanced study of knowledge organization using classificatory structures and creation of metadata element sets for representation. Conceptual and practical foundations for creating systems for information organization and representation. The creation, application, and use of a variety of systems and techniques for information organization and representation. Prerequisite: INFO 300; INFO 320.

INFO 440 Design Methods for Interaction and Systems (5) NW Theoretical and practical examination of the information systems design process. Techniques for assessing the need for technology, specifying the system design, and involving users in the design process are explored. Design methods include social impact statements, future scenarios, mock-ups, rapid prototyping, field-testing, heuristic evaluation. Prerequisite: CSE 373.

INFO 444 Value-Sensitive Design (5) Introduction to value-sensitive design (VSD), information system design that accounts for human values in a principled and comprehensive manner. Examination of existing systems from a VSD perspective. Explores VSD research methods including conceptual, technical, empirical investigations. Key values include accountability, autonomy, consent, privacy, property, trust, sustainability. Prerequisite: CSE 373.

INFO 445 Advanced Database Design, Management, and Maintenance (5) Advanced perspectives on DBMS theory, architecture, and implementation. Conceptual, logical, physical modeling. Index structures, query optimization and performance tuning, relational algebra, transaction processing, and concurrency control.

Operational databases, decision support systems, and data warehousing. Projects in database implementation and integration. Social implications of large distributed database systems. Prerequisite: INFO 340; CSE 373.

INFO 446 Advanced Search Engine Systems (5) Focus on design, development and evaluation of search engines. Theories and models in information retrieval for text and multimedia databases, Web search engines, recommendation systems, and digital libraries. Topics include language issues, data-mining, machine learning, user-profiling, visualization, user interfaces, usability. Coursework involves analytical comparisons of search engines. Prerequisite INFO 340.

INFO 447 Computer Supported Cooperative Work (5) Focuses on design and use of collaboration technologies to communicate, share information, and coordinate activity. Emphasis on behavioral and social aspects of adopting and using these technologies. Topics include the history of work in this and related fields, collaboration support for teams, organizations, and communities. Prerequisite: INFO 310.

INFO 449 Special Topics in Information Technology (1-5, max. 10) Various topics in information technology. Offered by visitors or resident faculty.

INFO 454 Information Policy: Domestic and Global (5) National and international information policy: public and private sector policy in terms of privacy, access, and exploitation; technology infrastructures and policies supporting the information industries; digital convergence and the emerging mega-industries. Prerequisite: INFO 311.

INFO 458 Reading Seminar in Social Aspects of Information Systems (2, max. 12) Addresses foundational issues in social aspects of information systems. Introduction to the intellectual traditions that underlie fields such computer ethics, social informatics, and value sensitive design. Format entails in-depth discussions based on careful reading of primary source texts selected by seminar participants.

INFO 459 Special Topics in Information Policy (1-5, max. 10) Various topics in information policy. Offered by visitors or resident faculty.

INFO 470 Research Methods in Informatics (5) Introduction to the research process investigating information needs, creation, organization, flow, retrieval, and use. Stages include: research definition, questions, objectives, data collection and management, data analysis, and data interpretation. Techniques include: observation, interviews, questionnaires, and transaction-log analysis. Prerequisite: STAT 220 or STAT 311.

INFO 484 Information Entrepreneurship (5) Investigates the development of innovative human-centered informatics products, with emphasis on the unique challenges and opportunities in high-value information products. Includes competition, strategic planning, tactical marketing, informatics product launches, and applied infopreneurship. Teamwork to create and present plans for innovative informatics products/services. Prerequisite: either INFO 300, INFO 310, or INFO 311.

INFO 489 Special Topics in Information Management (1-5, max. 10) Various topics in

information management, offered by visitors or resident faculty.

INFO 490 Design and Development of Interactive Systems (4-8, max. 8) Design and formative evaluation of an interactive information system to solve a real problem. Student-organized team projects are encouraged. Must be taken for a minimum of 5 credits. Prerequisite: INFO 340; INFO 341; INFO 380; INFO 440.

INFO 491 Research in Informatics (4-8, max. 8) Provides hands-on experience conducting a research project related to information behavior and technology. This project may be carried out in a natural setting or in the laboratory by preparing students to carry out similar research projects in their professional work. Prerequisite: INFO 310; INFO 380; INFO 440; INFO 470.

INFO 495 Internship in Informatics (1-5, max. 12) Internship in the private or public sector, as approved by faculty member. Work jointly supervised by faculty member (or approved academic sponsor) and an on-site work supervisor.

INFO 498 Special Topics in Informatics (1-5, max. 15) Various topics in informatics. Offered by visitors or resident faculty. Topics vary.

INFO 499 Independent Study (1-5, max. 15) Readings, design projects, or research under faculty supervision.

Information Management and Technology

IMT 440 Technology Foundations for Information Professionals (1-5, max. 5) Introduction to selected topics in information technology including computer architecture, computer network communication, discrete mathematics, algorithms and data structures, imperative programming, markup languages, and end-user programming tools.

IMT 480 Management Foundations for Information Professionals (1-5, max. 5) Introduction to selected topics in information management including organizational theory, learning, change, planning, organizing, leading, and controlling. Covers communication skill building topics as well, including presentation, written communication, and collaboration.

IMT 500 The Information Management Framework (1) Overview of the major concepts in the MSIM curriculum. Includes an introduction to the concept of information as well as its relation to organizational management, technology, and design and culture.

IMT 510 Human Aspects of Information Systems (4) Social, organizational, cognitive, behavioral and contextual aspects of information, including basic concepts in human information behavior, conceptual and practical frameworks used to study human-information interaction, and social responses to information technology. User-based and work-based evaluation and design of information systems. Exposure to experimental and interview methodologies.

IMT 520 Information Services and Resources (4) Concepts, processes, and skills of information involving creation, production, distribution, selection, collection, and services to facilitate access. Analysis of the information mediation process, including determining information

needs; searching for, evaluation and presentation of appropriate results; and modalities for delivery of services.

IMT 530 Organization of Information Resources (4) Introduction to issues in organization of information and information objects including analysis of intellectual and physical characteristics of information objects; use of metadata and metadata standards for information systems; theory of classification, including semantic relationships and facet analysis; creation of controlled vocabularies; and display and arrangement.

IMT 540 Design methods for Interaction and Systems (4) Introduction to the theory and practice of user-centered design. Examines design methods for identifying and describing user needs, specifying and prototyping new systems, and evaluating the usability of systems. Examines design methodologies such as contextual design and value-sensitive design, giving specific emphasis to human-information interaction. Prerequisite: permission of instructor.

IMT 541 Principles of Database and Semi-Structured Data Systems (5) Introduction of database management systems for teh storage and access of structured and semi-structured information. Examines the relational model, Structured Query Language (SQL), Entity-Relationship modeling, database design methodology) conceptual, logical, and physical design), and Extensible Markup Language (XML) for storage, retrieval, and interchange. Prerequisite: IMT 540.

IMT 542 Principles of Information Retrieval Systems (3) Introduction to information systems for the storage and retrieval of unstructured information. Examines information retrieval architectures, processes, retrieval models, query languages, and methods of system evaluation. Gives emphasis to Internet-based services for storing and accessing information to be used in integrated application development. Prerequisite: IMT 540.

IMT 546 Data Communications and Networking (4) Local and wide area computer networking including network topologies and hardware, packet switching, client/server architectures, network protocols, and network servers and applications. Addresses server operating systems, management, security, authentication, and policy issues associated with distributed networks. Prerequisite: IMT 510.

IMT 548 Information System Design (5) Theoretical and practical examination of information systems analysis and design processes as they apply in the workplace. Explores techniques for assessing the need for technology, defining specifications, and involving users in the design process. Design methods include social impact statements, future scenarios, mock-ups, rapid prototyping, and field-testing. Prerequisite: IMT 540.

IMT 550 Policy, Law, and Ethics in Information Management (3) Select concepts, processes, and issues related to the organizational contexts within which information professionals practice. Topics include information as public/private good, intellectual property, privacy, confidentiality, information liability, and information policy. Focus on contemporary issues affecting the role of the information manager.

IMT 580 Management of Information Organizations (4) Survey of leadership

competencies in business information, social process, human factors, and Information Technology (IT) contexts. Examines manager and director level leadership activities in conveying the relevance of IT, managing critical relationships, and implementing IT-based solutions, in an effort to ensure information resource initiatives are aligned with organizational objectives.

IMT 581 Information and the Management of Change (3) Practical application of the critical roles and aspects of information and information processes in the management of organizational change. Topics include organization learning, knowledge management as a process, business process change, change project management, business/competitive intelligence, benchmarking, and best practices. Prerequisite: IMT 580.

IMT 582 Strategic Information Initiatives (4) Studies and applies strategic information initiatives within an organization, including: readiness assessment, organizational mandates, information inventories, content management, information audits, and information architecture initiatives. Focuses on building business cases for and leading information initiatives in organizations. Prerequisite: IMT 581.

IMT 583 Finance and Accounting Foundations for Information Professionals (3) Introduction to financial accounting, including the principles of double-entry accounting, balance sheets, income, and cash flow statements. Covers key financial ratios and their use for various analytical purposes, along with the elements of a financial plan or budget. Prerequisite: IMT 510; IMT 580.

IMT 584 Marketing Foundations for Information Professionals (3) Introduction to the principles of marketing. Looks at how to assess an environment from a marketing perspective, consumer and business behavior, market segmentation, product/service strategies, new product development processes, pricing, channels, retail/wholesale, marketing communication, and direct selling. Prerequisite: IMT 510; IMT 580.

IMT 585 Human Resource Management Foundations for Information Professionals (3) Introduction to human resource management for information professionals. Covers the principles of job analysis, employee selection, interviewing, training, and appraisal. Prerequisite: IMT 510; IMT 580.

IMT 586 Information Dynamics I (4) Introduction to the concepts and methods of information feedback, systems thinking, soft systems methodology (SSM), and "soft operations research," as well as the quantitative modeling of complex dynamic systems by means of differential and integral equations (system dynamics).

IMT 587 Information Dynamics II (4) Advanced concepts and methods of information feedback, systems thinking, soft systems methodology (SSM), and "soft operations research," as well as the quantitative modeling of complex dynamic systems by means of differential and integral equations (system dynamics), including model building, testing, and validating. Prerequisite: IMT 586.

IMT 589 Special Topics in Information Management (1-4, max. 12) Special study and research in topics of current concern to faculty and students.

IMT 595 Stakeholders, Information, and Technology (3-5, max. 5) Capstone experience. Addresses system integration and the increasing demand to apply a broad range of technologies to the information needs of diverse user groups during the implementation of comprehensive information systems across an organization. Encourages student-organized individual/team projects. Prerequisite: completion of IMT core courses 510 through 582.

IMT 598 Emerging Trends in Information Management and Technology (3) Focus on emerging trends in information management and information technology. Attention given to their impact on the functions of the chief information officer and others managing the acquisition, retention, use and disposition of information and the enabling technologies. Exploration of methods and resources for trend discovery and tracking. Prerequisite: IMT 510.

IMT 590 Fieldwork in Information Management (1-4, max. 12) Supervised fieldwork. May be taken in as many as six consecutive quarters. Prerequisite: enrollment in the MSIM program.

IMT 600 Independent Study or Research in Information Management (1-4, max. 12) Supervised independent study or research. May be taken in as many as six consecutive quarters. Prerequisite: enrollment in the MSIM program.

Information Science

INSC 500 Faculty Seminar(2) Presentations by faculty concerning research projects in which they are involved.

INSC 501 Theoretical Foundations for Information Science (3) In-depth exploration of the philosophical, theoretical, methodological, and historical foundation of information science and the study of information.

INSC 510 Theoretical Foundations of Human Information Behavior (4) Study of constructs, concepts, models, and theories information scientists use in studying human information behavior. Socio-cognitive aspects of individuals needing, seeking, giving, and using information. Models of information behavior, conceptual frameworks, assumptions, analytical tools, and the factors that differentiate groupings of information users and predict or influence information behavior.

INSC 530 Knowledge Representation (2/4) In-depth survey of the various approaches to knowledge representations in areas such as taxonomy, library classification, anthropology, cognitive psychology, linguistics, and artificial intelligence.

INSC 540 User-Centered Information System Design (4) Seminar in theories and methods for user-centered and system-centered approaches to information system design. Research and issues in the design process, development, and evaluation of information systems. Technical context typically includes one or more of the following: information retrieval, human-computer interaction, or computer-supported cooperative work. Prerequisite: permission of instructor.

INSC 550 Information Policy (4) Doctoral seminar in the foundations of information policy including intellectual freedom s public/private good, intellectual property, privacy, and digital convergence, and the reshaping of information

practices and information industries. Prerequisite: Permission of instructor.

INSC 565 Teaching Practicum I (3) Doctoral student participation in teaching in a faculty-taught course. Credit/no credit only.

INSC 566 Teaching Practicum II (3) Doctoral student takes primary teaching responsibility for a course under supervision of a faculty liaison. Credit/no credit only. Prerequisite: INSC 565.

INSC 570 Research Design (4) Introduction to empirical research, basics of theory construction and research design, types of research, ethical issues, instruments and techniques for descriptive research, measures of association. Employs an integrated (qualitative and quantitative) and focused approach.

INSC 571 Quantitative Methods in Information Science (5) Describes uses, characteristics, and theoretical bases of research methods and data analysis techniques used in quantitative research, emphasizing uses in information and library science. Topics include experimental design, descriptive and inferential statistics, the normal distribution, elementary probability, nonparametric statistics, and exploratory data analysis techniques. Prerequisite: INSC 570.

INSC 572 Qualitative Methods in Information Science (5) Principles and approaches to conducting qualitative research in information science, including how to design a qualitative study, role of context, methods of data collection and analysis, increasing the trustworthiness of data, minimizing observer effect, how to incorporate and build theory. Exposure to field research and data analysis. Prerequisite: INSC 570.

INSC 575 Research Practicum I (3) Students work with a researcher from the Information School as an active member of a research team. Credit/no credit only.

INSC 576 Research Practicum II (3) Students will work with an approved researcher as an active member of a research team. Credit/no credit only. Prerequisite: INSC 575 or permission of instructor.

INSC 598 Special Topics in Information Science (3, max. 12) .

INSC 599 Independent Study in Information Science (1-5, max. 15) Readings, design projects, or research under faculty supervision. Prerequisite: permission of instructor and Ph.D. program chair.

INSC 600 Independent Study or Research (*) Credit/no credit only.

INSC 800 Doctoral Dissertation (*) Credit/no credit only.

Information Technology Applications

ITA 340 Introduction to Web Publishing (3) Introduction to markup languages and publishing web content. Students gain understanding of HTML coding and extensions, image manipulation, information architecture, and web site publishing. Other topics include: the Web Accessibility Initiative, survey of Graphical User Interface (GUI) HTML editors, online privacy and security, and eXtensible Markup Language (XML).

ITA 341 Client-side Scripting and Design (3) Introduction to web browser design environment, scripting languages, JavaScript, Document Object Model (DOM), and creation of dynamic HTML web pages (DHTML) in combination with Cascading Style Sheets (CSS). Other topics include: client-server architecture and web design principles in the contexts of technical feasibility, usability, and accessibility. Prerequisite: ITA 340.

ITA 342 Introduction to SQL and Data Storage Technologies (3) Fundamentals of database design in a client-server architecture useful for web applications. Subsequent topics build upon foundation by introducing the Structured Query Language (SQL), open source tools MySQL and PHP for database processing, security issues in database applications, and XML as an alternate database storage technology. Prerequisite: ITA 341.

ITA 343 Server-Side Programming and Web-data Integration (3) Provides framework to integrate server-side programming concepts and techniques, database technologies, and client-side scripting to design and implement dynamic web applications. Examines techniques using PHP, design and implementation of database (MySQL) connections, web application security, and XML data publication. Prerequisite: ITA 342.

Library and Information Science

LIS 462 Skills Approach to Information, Communications, and Technology (ICT) Literacy (3) Introduction to the *Big6*™ Skills approach to information, communications, and technology (ICT) literacy for personal, school, district, or higher education settings. Includes technology within the Big6 framework, connection to standards, instructional design, assessment, curriculum mapping, peer collaboration, the parent connection, program planning, and implementation.

LIS 498 Special Topics (1-5, max. 15) Library service and information science subject matter in seminars, workshops, or other appropriate formats. Topics vary and may be repeated for credit.

LIS 500 The Life Cycle of Information (2) Overview of the major concepts, processes and systems, actors, and operations in the life cycle of information. Introduction to the creation, publishing and distribution, evaluation and selection, organization, access, retrieval, and use of information. Exploration of the social context in which these processes and their stakeholders interact. Credit/no credit only.

LIS 505 Archival and Manuscript Services (3) Selection, organization, and uses of archival and manuscript collections. Emphasis on the principles and techniques; some attention to the administration of state archival and historical institutions' collections. Lecture, demonstration, and laboratory.

LIS 507 Preservation and Conservation of Library Materials (3) Consideration of the many factors contributing to the physical vulnerability of library materials of all kinds and an overview of resources and strategies for those who determine preservation policy or manage the application of such policy. No technical background necessary.

LIS 508 History of Recorded Information (4) Exploration of the history and ongoing

transformation of recorded information within three broad spheres of human life: public communication, administrative and commercial operation, and personal communication.

LIS 510 Information Behavior (4) Introduction to the user-centered approach to information behavior. Theoretical foundations of various information behaviors such as information need, utilizing, gathering, seeking, and evaluating. Synthesis of user studies, construction of user profiles, performance of gap analysis, and application of the results of user studies to improve services and system design. Prerequisite: LIS 500.

LIS 511 Systems Analysis (4) Introduction to the systems approach including basic concepts in the approach, dimensions of systems and steps in systems design. Emphasis is on the analysis, evaluation and design of information systems and services. Prerequisite: LIS 500.

LIS 512 Community Analysis (4) Key concepts of community in its broadest sense, methodological approaches for analyzing information needs and available resources, how to design information services in response to identified needs, and service evaluation. Facilitating the information behavior of all groups within a community and identifying how their needs interconnect. Prerequisite: LIS 510.

LIS 515 Ecological Information Systems (4) Introduction to cognitive work analysis framework. Prepares for active role in design and evaluation of information systems. Familiarization with basic concepts of cognitive systems engineering and practice in field study, data analysis, and transforming field findings into requirements for the design of an information system. Offered: jointly with T C 515.

LIS 519 Special Topics in Information Behavior (1-4, max. 18) Introduction to innovative and specialized topics in information behavior. Course may be offered irregularly and may be repeated for credit. Prerequisite: LIS 510; others as determined by the specific topics covered.

LIS 520 Information Resources, Services, and Collections (4) Concepts, processes, and skills related to parts of the life cycle of knowledge involving creation, production, distribution, selection, collection, and services to facilitate access. Specific discussion topics include characteristics of recorded knowledge; organizations and services devoted to managing access to recorded knowledge; principles associated with development of recorded knowledge and collections. Prerequisite: LIS 500.

LIS 521 Principles of Information Services (4) Analysis of the information mediation process, including determination and analysis of information needs; searching for, evaluation, and presentation of appropriate results; modalities for delivery of services; and current and future techniques. Prerequisite: LIS 520.

LIS 522 Collection Development (3) Access to materials as context for development and management of library collections in academic, public, school libraries. Community analysis, library mission; collection development policies, criteria, levels, responsibilities; aids to selection; collection evaluation, use studies; controversial materials.

LIS 523 Advanced Information Services (4) Investigation of the development, administration, and evaluation of information services for supporting the research process both within and across organizations. Prerequisite: LIS 521 or permission of instructor.

LIS 526 Government Publications (3) Introduction to government publications of the United States and their acquisition, organization, and use. Other topics covered include the public's right to know, the Federal Depository Library Program, government influences in our daily lives, and future directions in government information. Credit/no credit only.

LIS 527 Business Information Resources (3) Survey of the extent and nature of business information and its sources, and of business information producers and consumers. Study and use of both print and on-line sources.

LIS 528 Health Sciences Information Needs, Resources, and Environment (3) Characteristics of users of health sciences information; health professionals, researchers, consumers and patients; environments (academic health sciences centers, hospitals, clinics, and public libraries); evaluation of information resources in health care; types and uses of health information management systems; policy issues, professional standards, education, and certification. Offered: jointly with MEDED 570.

LIS 529 Special Topics in Information Resources, Services and Collections (1-5, max. 18) Introduction to innovation and specialized topics in information resources, services and collections. Prerequisite: LIS 500, LIS 520; others as determined by the specific topic covered.

LIS 530 Organization of Information and Resources (4) Introduction to issues in organization of information and documents including: analysis of intellectual and physical characteristics of documents; principles and practice in surrogate creation, including standards and selection of metadata elements; theory of classification, including semantic relationships and facet analysis; creation of controlled vocabularies; and display and arrangement. Prerequisite: LIS 500, which may be taken concurrently.

LIS 531 Catalogs, Cataloging, and Classification (4) Develops an understanding of library catalogs as information retrieval systems. Introduces library cataloging and classification. Focus on principles and standards in the creation of catalogs and cataloging records. Includes practice in descriptive and subject cataloging and classification. User perspective emphasized throughout. Prerequisite: LIS 500, LIS 530.

LIS 533 Advanced Cataloging and Classification (4) In-depth theory and practice in library cataloging and classification. Includes introduction to cataloging materials in a variety of formats. Prerequisite: LIS 500, LIS 530, and LIS 531.

LIS 535 Classification Theory (3) Survey of classificatory principles from bibliographic, philosophical, socio-cognitive, and linguistic perspectives. Overview of history of bibliographic classification and exploration of some existing bibliographic classification systems. Ramification of theoretical approach for classification practice. Prerequisite: LIS 530.

LIS 536 Indexing and Abstracting (3)

Exploration of issues in subject representation. Survey of different approaches, techniques, and methods for representing the subject matter of documents, including an evaluation of the role of users and context in subject representation. Formulation of policies for indexing and abstracting services. Prerequisite: LIS 530.

LIS 537 Construction of Indexing Languages (4)

Exploration of the design, construction, evaluation, and maintenance of controlled indexing languages, including studies of how users are integrated into the design process. Through completion of thesaurus construction project, prepares students to design index languages, plan and implement a design project, and evaluate indexing languages. Credit/no credit only. Prerequisite: LIS 530.

LIS 538 Metadata: Evolving Principles and Practices (3)

Principles, skills and practices in the conceptualization and implementation of metadata and metadata systems with a focus on semantic interoperability in distributed environments. Topics include metadata development for attribute and value spaces, metadata registry roles and services, organizational mechanisms, Web Services and advanced search engines. Prerequisite: LIS 530, LIS 540 or equivalent.

LIS 539 Special Topics in Organization of Information and Resources (1-4, max. 18)

Introduction to innovative and specialized topics in the organization of information and resources. Prerequisite: LIS 500, LIS 530; others as determined by the specific topic covered.

LIS 540 Information Systems, Architectures and Retrieval (5)

Introduction and overview of information systems, system architectures, and retrieval models. Emphasis given to the role of users in the design, development, and evaluation of information retrieval and database management systems. Prerequisite: LIS 500, which may be taken concurrently.

LIS 541 Internet Technologies and Applications (3)

Overview of Internet technologies including networking hardware, the TCP/IP protocol suite, addressing, packets and routing, the client/server model. End-user applications for communication and collaboration such as telnet, FTP, email, conferencing, and streaming media. Web site creation, development, and management. Credit/no credit only.

LIS 542 Conceptual Database Design (5)

Introduction to relational database theory and technology from an information science perspective. Focuses on traditional transactional database theory, architecture and implementation in a user-centered systems context. Introduces set and graph theory, relational algebra, and data warehouses. Credit/no credit only. Prerequisite: LIS 511 or LIS 540.

LIS 543 Design of Information Systems (3)

Discusses how theories of conceptual data modeling affect design of database and information systems, examines relationships between modeling and implementation, and bridges gaps between theoretical understanding of database design and implementation issues. Implements conceptual schemata development in 542.

LIS 544 Information Retrieval System (3)

Covers theories and models in information retrieval (IR) and reviews user-centered and system-centered approaches. Issues involved in

the design, development and evaluation of IR systems are examined including: methods and tools for document analysis, retrieval techniques, search engines, interfaces, usability, evaluation.

LIS 545 Programming for Information Systems (5)

Introduction to structured object-oriented programming for information systems. Focus on fundamental principles of programming with attention to elementary algorithms and data structures, interface design, user testing, and knowledge representation. Prerequisite: LIS 540 or permission of instructor.

LIS 546 Network System Administration (4)

Introduction to local area network hardware, topologies, operating systems, and applications. Covers aspects of network setup and management including network and application protocols, system configuration, security and Internet connectivity. Hands-on experience with network applications and operating systems. Prerequisite: LIS 500.

LIS 549 Special Topics in Information Systems, Architectures, and Retrieval (1-4, max. 18)

Introduction to innovative and specialized topics in information systems, architectures, and retrieval. Prerequisite: LIS 540, plus others as determined by topic.

LIS 550 Information in Social Context (4)

Concepts, processes, and issues related to the larger social context within which the life cycle of knowledge is played out. Discussion topics include intellectual freedom, information as public/private good, intellectual property, privacy, confidentiality, information liability, information and telecommunications policy, the economics of information, and other professional values. Prerequisite: LIS 500, which may be taken concurrently.

LIS 551 Intellectual Freedom in Libraries (3)

Analysis of issues related to intellectual freedom, particularly to implications for libraries and librarians. Consideration of current legal climate, conformity versus freedom in modern world, librarian as censor, social responsibility and individual freedom, intellectual freedom of children, prospects for future. Credit/no credit only.

LIS 554 Information Policy: Domestic and Global (5)

National and international information policy: public and private sector policy in terms of privacy, access, and exploitation; technology infrastructures and policies supporting the information industries; digital convergence and the emerging mega-industries. Prerequisite: LIS 550 or permission of instructor.

LIS 558 Reading Seminar in Social Aspects of Information Systems (2)

Addresses foundational issues in social aspects of information systems. Introduces students to the intellectual traditions that underlie fields such as computer ethics, social informatics, and value sensitive design. Format entails in-depth discussions based on careful reading of primary source texts selected by seminar participants. Prerequisite: permission of instructor.

LIS 559 Special Topics in the Social Context of Information (1-4, max. 18)

Introduction to innovative and specialized topics in the social context of information. Course may be offered irregularly and may be repeated for credit. Prerequisite: LIS 550 and others as determined by the specific topic covered.

LIS 560 Instructional and Training Strategies for Information Professionals (3)

Develops knowledge and skills in instruction and training functions for library and information settings. Issues and strategies for learning and teaching. Design, development, and evaluation of information and technology literacy programs. Addresses the needs of users when designing and delivering instruction. Prerequisite: LIS 500, which may be taken concurrently.

LIS 561 Storytelling: Art and Techniques (3)

Storytelling, past and present, noting its development as an art form. Analyzing storytellers materials (folk literature and literary forms) throughout historical periods. Essential techniques necessary to this artistic skill. Planning storytelling programs for various ages, interest groups, and situations, utilizing folk, classic, and contemporary literature.

LIS 565 Children's Materials: Evaluation and Use (4)

Library materials for children from infancy through elementary grades. Focus on resources in all media that serve informational, educational, cultural, and recreational needs of the young. Focuses on standard bibliographies and other resources designed to meet informational needs of adults serving children. Prerequisite: LIS 500, LIS 510, LIS 520, or permission of instructor.

LIS 566 Young Adult Materials: Evaluation and Use (4)

An overview of materials reflecting adolescents' interest in media and addressing their educational, cultural, and recreational needs. Students evaluate print literature, electronic and other non-print media for young adults. Content also designed to assist adult caregivers of adolescents. Prerequisite: LIS 500, LIS 510, and LIS 520 or permission of instructor.

LIS 567 Public Library Services for Youth (3)

Administration of youth departments in public libraries; planning and promoting programs and services; evaluation of library collections; community and professional roles of the youth librarian. Prerequisite: LIS 500 or permission of instructor.

LIS 568 Information Literacy for Teaching and Learning (5)

Theories, process, and practical applications of information literacy. Development of information literacy programs for libraries, community agencies, business, education or other information settings. Intrinsic themes include the integral relationship between technology and information literacy, and continual evaluation.

LIS 569 Special Topics in Instructional and Training Strategies for Information Professionals (1-5, max. 18)

Introduction to innovative and specialized topics in instructional and training strategies for information professionals. Prerequisite: LIS 560 and others as determined by the specific topic covered.

LIS 570 Research Methods (4)

Research as a process from problem definition and formulation of questions to design, data collection, analysis, and reporting. Students recognize research opportunities, translate them into researchable frameworks, design research projects, and implement results in libraries and other information agencies. Prerequisite: LIS 500, which may be taken concurrently.

LIS 579 Special Topics in Research Methods (1-4, max. 18)

Introduction to innovative and specialized topics in research methods.

Prerequisite: LIS 500, LIS 570; others as determined by specific topic covered.

LIS 580 Management for Information Organizations (4) Introduction to internal and external management issues and practices in information organizations. Internal issues include organizational behavior, organizational theory, personnel, budgeting, planning. External issues include organizational environments, politics, marketing, strategic planning, funding sources. Prerequisite: LIS 500, which may be taken concurrently.

LIS 581 Marketing and Planning for Libraries (3) Approaches to planning and marketing library products/services. Examines partnerships that can be forged between elements of marketing and appropriate futures strategies for libraries. Discusses marketing and planning as integrated processes with attention to short- and long-term goals and objectives. No particular library institutional setting is assumed. Prerequisite: LIS 500, which may be taken concurrently.

LIS 582 Strategic Planning and Management of Information Technology (3) Exploration of methods of strategic planning for managing information resources and technology to support online information services and the role of the systems librarian and CIO. Topics include mission and goals, strategic planning, the information technology function within organizations, and the desirable abilities of managers and leaders. Prerequisite: LIS 580.

LIS 583 Staffing Information and Information Technology Positions (3) Staffing and human resources related to information organizations and the information technology unit. Examination of demand for and supply of information and information technology workers, recruitment, training, and retention. Prerequisite: LIS 580.

LIS 584 Knowledge Management (3) Introduction to contemporary topics in management of knowledge creation and use in organizations. Discussion topics include knowledge generation, knowledge taxonomy, knowledge transfer, organizational knowledge management practice, and knowledge management systems. Prerequisite: LIS 500; LIS 580, or permission of instructor.

LIS 585 Administration of the School Library Media Program (3) Develops competency in

administering materials, equipment, and services of library media program as integral part of educational process of school. Focuses on developing skills in acquiring, organizing, and managing full range of learning resources for access and use, and communicating the program to users. Required for school library media specialists. Prerequisite: LIS 580.

LIS 586 Public Libraries and Advocacy (3) Examines the purpose and role of public libraries in an information society. Includes governance, services, and planning with special emphasis on advocacy for the library and community.

LIS 587 Library Technology Systems (4) Developing criteria for selection and design of information technology systems for libraries and information centers. Applying criteria in evaluation of hardware and software. Examining related management challenges, such as vendor relations, financing options, personnel requirements, and design of auxiliary activities. Prerequisite: LIS 540, LIS 580, or permission of instructor.

LIS 588 Special Librarianship (3) Seminar in the practice of special librarianship in business and industrial firms, government agencies, and the free-lance sector. User services and information resources. Credit/no credit only. Prerequisite: LIS 580.

LIS 589 Special Topics in Management of Information Organization (1-4, max. 18) Introduction to innovative and specialized topics in management of information organizations. Prerequisite: LIS 500, LIS 580; others as determined by the specific topic covered.

LIS 590 Directed Fieldwork (2-4, max. 8) Minimum of 100 hours, maximum of 200 hours of professional, supervised fieldwork in a library or professional information setting. Fieldwork is a one-quarter experience; however, this may be repeated in a different setting with a different set of learning objectives for a subsequent quarter. Library and Information Science majors only. Credit/no credit only. Prerequisite: 30 credits in Library and Information Science program.

LIS 591 Legal Research I (3) Introduction to legal bibliography and law librarianship. Basic primary and secondary legal bibliographic tools.

Integration of manual and computer resources for effective legal research. Emphasis on state materials. Offered: jointly with LAW A 598.

LIS 592 Legal Research II (3/4) Legal tools that answer more complex legal research problems, such as federal legislative histories, sources of administrative law, specialized subject research. Federal emphasis. Builds on skills and techniques taught in LIS 591/LAW A 598. Extensive work with online resources. Prerequisite: LIS 591 or permission of instructor. Offered: jointly with LAW A 599.

LIS 593 Selection and Processing of Law Library Materials (3) Study of tools for collection development and collection development plans in law libraries. All law library technical processes, including acquisitions, budgeting, cataloging, and serials. Prerequisite: LIS 591 or permission of instructor.

LIS 594 Law Library Administration (4) Administration in law libraries, including organization, personnel, and management issues (e.g., interviewing, hiring, firing), communications, library planning, and bookkeeping. Credit/no credit only. Prerequisite: LIS 591 or permission of instructor.

LIS 595 Current Issues in Law Librarianship (4-, max. 4) From a list of current topics in law librarianship, students select a topic, research it fully, write a major paper, and present their paper. Topics may include citation reform, ethics, and publisher practices. Credit/no credit only. Prerequisite: Law Librarianship majors or permission of instructor.

LIS 598 Special Topics in Information and Library Science (1-6, max. 18) Seminar dealing with various topics in information and library science. Offered by visitors or resident faculty. Topics are changed from quarter to quarter. May not be offered every quarter. Prerequisite: determined by specific course.

LIS 600 Independent Study or Research (*) Credit/no credit only.

LIS 700 Master's Thesis (*) Credit/no credit only.

Interdisciplinary Graduate Programs

Biomolecular Structure and Design

BMSD 520 Research Seminar (0.5, max. 9) Group conferences on graduate student research. Prerequisite: BMSD graduate student or permission of instructor. Offered: AWSp.

BMSD 540 Literature Review (2) Emphasizes critical evaluation of original articles in literature from all fields relevant to Biomolecular Structure and Design. Scientific writing and oral presentations emphasized. Concurrent registration in BIOC 530 required. Prerequisite: first-year BMSD student or permission of instructor. Offered: A.

BMSD 541 Literature Review in Biomolecular Structure and Design (2) Emphasizes critical evaluation of original articles in literature from all fields relevant to Biomolecular Structure and Design. Scientific writing and oral presentations emphasized. Prerequisite: first-year BMSD student or permission of instructor. Offered: W.

BMSD 542 Literature Review in Biomolecular Structure and Design (2) Emphasizes critical evaluation of original articles in literature from all fields relevant to Biomolecular Structure and Design. Scientific writing and oral presentations emphasized. Prerequisite: first-year BMSD student or permission of instructor. Offered: Sp.

BMSD 599 Introduction to Research in Biomolecular Structure and Design (3-6, max. 24) Student works with one of the research groups within the Biomolecular Structure and Design Program for one quarter and then rotates to another laboratory for one additional quarter. Minimum two quarters, maximum four. Prerequisite: BMSD student or permission of instructor. Offered: AWSpS.

Global Trade, Transportation, and Logistics

GTTL 501 Global Logistics Management (4) Provides an overview of the concepts and substance of trade, transportation, and logistics. Deals with management of physical, documentation, and information flows within supply chains, including purchasing, distribution, intermodal transportation, ERP e-commerce and e-fulfillment, financial transactions, and regulations. Prerequisite: permission of instructor. Offered: jointly with OPMGT 535; AW.

GTTL 502 Seminar in Global Trade, Transportation, and Logistics (4) Interdisciplinary seminar that brings together students with academics and practitioners at the forefront of trade, transportation, and logistics in discussions of selected topics. Additionally, students research issues of special interest. Prerequisite: OPMGT 535, GTTL 501, or permission of instructor. Offered: jointly with OPMGT 536; Sp.

GTTL 598 Global Aviation Management (3) Integrates aviation-related engineering, marketing, logistics, global trade, transport geography, and finance disciplines. Introduction to airplane, airport, and air traffic technology; aircraft/air traffic control/airline terminology; and aviation practices.

GTTL 599 Special Topics in Global Trade, Transportation, and Logistics Studies (1-5, max. 15) Selected topics with special emphasis on issues of pressing importance to the world trading community. Topics vary with departmental discretion. Prerequisite: Graduate students or permission of instructor.

GTTL 600 Independent GTTL Studies(*, max. 30) Opportunity to pursue GTTL-related issues that may not be explored in established UW courses. May involve projects undertaken in conjunction with entities beyond the University, subject to instructor approval.

GTTL 601 Internship in GTTL Studies(3-5, max. 9) Opportunity to pursue relevant research or to gain practicum experience in the employment of a department-approved public or private entity.

Graduate School

GRDSCH 610 Teaching Mentorship (3, max. 6) Individualized project, under the direction of a faculty member, focused on issues of teaching and learning at the college/university level and designed to enhance the student's ability to make innovative contributions in teaching. Credit/no credit only. Prerequisite: permission of graduate program coordinator and the Associate Dean of the Graduate School.

GRDSCH 615 Teaching Assistant Preparation (1-6, max. 6) Department or University-wide training for teaching and research assistants. Credit/no credit only.

GRDSCH 616 Research Assistant Preparation (1-6, max. 6) Department or University-wide training for research assistants. Credit/no credit only.

GRDSCH 620 Teaching Mentorship Seminar (2) Interdisciplinary seminar. Individual mentorship projects are presented and discussed, as are more general topics related to the teaching mentorship experience. Credit/no credit only. Prerequisite: GRDSCH 610 which may be taken concurrently or permission of the Associate Dean of the Graduate School.

GRDSCH 630 Special Topics in College/University Teaching (2, max. 6) Interdisciplinary discussion of a variety of topics related to college/university teaching with an emphasis on innovation in teaching. Topics of broad campus interest complement similar offerings in individual disciplines. Credit/no credit only.

Individual Ph.D.

IPHD 600 Independent Study (*)

IPHD 800 Independent Study (*)

Molecular and Cellular Biology

MCB 511 Cell Cycle Control (3) *Breeden, Roberts, Edgar* Studies recent advances in understanding cell-cycle control, arising from genetics and biochemical studies of fission and budding yeast, marine invertebrates, *Drosophila*,

amphibians, and cultured cells. Addresses the biochemical processes and molecular interactions and the rate-limiting events in the cell cycle, and the coupling of those events to physiological signals. Offered: A.

MCB 513 Development Journal Seminar (1, max. 12) *Moens, Soriano, Swalla* Examines current literature about specific topics in developmental biology. The seminar chooses current monthly topics and the group meets weekly to discuss published research papers. Topics may include: germ cell specification; cell migration and morphogenesis; axis formation; somitogenesis and stem cells. Offered: AWSp.

MCB 514 Molecular and Cellular Biology Literature Review (2) *Roelink* Emphasizes critical evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program.

MCB 515 Molecular and Cellular Biology Literature Review (2) *Stoddard* Emphasizes critical evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: W.

MCB 516 Molecular and Cellular Biology Literature Review (2) *Stoddard* Emphasizes critical evaluation of the original literature orally and in writing. Open only to first-year students in the Molecular and Cellular Biology Program. Offered: S.

MCB 517 Topics in Molecular and Cellular Biology (1-5, max. 12) Advanced in-depth coverage of specific areas of molecular and cellular biology of current interest. Lectures by University of Washington faculty and invited speakers involved in research in this area. A basic knowledge of principles of molecular and cellular biology assumed.

MCB 519 Topics in Cancer (1, max. 6) Examination of ways to integrate basic, clinical, and public health sciences to increase understanding of human biology and disease. Seminars in introduction to cancer research as viewed by basic, clinical, and public health sciences, origins of cancer, cancer prevention, cancer progression, and therapies for cancer. Credit/no credit only.

MCB 520 Tutorial in Molecular and Cellular Biology (1-2, max. 2) *Stoddard* Special topics reading and discussion. Offered: A.

MCB 521 Embryos, Genes and Development (4) *Parkhurst, Priess, Soriano* Introduction to vertebrate and invertebrate development emphasizing cellular, genetic, and molecular mechanisms. Focuses on development of fruit flies, nematodes, and mice. Emphasizes embryological processes including induction, determination, pattern formation. Relationship between development and evolution. Technologies include transgenic animals, genetics, mosaic analysis, homologous recombination, somatic cell genetics, embryonic manipulations. Offered: W.

MCB 532 Human Pathogenic Viruses (3) *Galloway, Linail* Replication, regulation, and pathogenesis of several groups of human viruses, including human immunodeficiency virus and papillomaviruses. Emphasis on the unique

aspects of the viral-like cycles as they relate to effects on infected cells and organisms. Guest lecturers focus on viral immunology, measles, herpes simplex virus and HHV-8. Offered: W.

MCB 542 Nucleic Acids and Enzymes (2)
Stoddard Covers the biology, evolution, mechanisms, and structure/function relationships of enzymes that act on DNA and RNA. Focuses both on various molecular systems, and also on important techniques used for their study, including high resolution structure determination, single molecule methods, kinetics and thermodynamic binding analyses, and protein engineering. Offered: Sp.

MCB 560 Biotechnology Externship (2-12, max. 12) *Moon* Supervised research in a biotechnology company. Prerequisite: permission of instructor and doctoral candidacy. Offered: AWSpS.

MCB 562 Cell Signaling and Oncogenesis (3)
Cooper, Tappscott Discusses the roles of cell architecture, signal transduction, and the nucleus in homeostasis of normal tissues and in cancer. Regulation of cell proliferation and differentiation in normal tissues. Protooncogenes and oncogenes. Tumor suppressor genes. Cell-cell and cell-matrix interactions. The development, vascularization, metastasis of tumors. Offered: Sp.

MCB 580 Teaching Practicum in Molecular and Cellular Biology (3, max. 6) Supervised training in the teaching of molecular and cellular biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MCB 599 Introduction to Research in Molecular and Cellular Biology (*, max. 20)
The student rotates through one research laboratory involved in the Molecular and Cellular Biology Program per quarter. Open only to first-year students in the Molecular and Cellular Biology Program. Credit/no credit only. Offered: AWSpS.

MCB 600 Independent Study or Research (*).

MCB 700 Master's Thesis (*) Offered: AWSpS.

MCB 800 Doctoral Dissertation (*).

Museology

MUSEUM 480 Introduction to Museology (3)
I&S Museum history, philosophy, and basic operations, including organization, income, collection management, conservation, exhibition, security, education, research, and ethics. Offered: jointly with ANTH 480.

MUSEUM 488 Special Topics in Museology (3-5) In-depth examination of selected current issues within the field of museology.

MUSEUM 600 Independent Study or Research (1-10, max. 10).

MUSEUM 700 Master's Thesis (1-10, max. 10).

MUSEUM 710 Master's Project (1-10, max. 10)
Credit/no credit only.

Near and Middle Eastern Studies

N&MES 800 Doctoral Dissertation (*).

Neurobiology and Behavior

NEUBEH 501 Introduction to Neurobiology (3)
Survey of all aspects of neuroscience, including molecular and cellular neurobiology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: A.

NEUBEH 502 Introduction to Neurobiology (4)
Survey of all aspects of neuroscience, including an introduction to neuroanatomy and modules on sensory and motor systems. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: W.

NEUBEH 503 Cognitive and Integrative Neurobiology (4) Survey of all aspects of neuroscience, including a discussion of higher neural processes like learning, memory, and neuroendocrinology. Lecture and laboratory discussion of original literature, observation of demonstrations, and examination of macroscopic and microscopic neural tissue. Offered: Sp.

NEUBEH 510 Seminar in Neurobiology and Behavior (0.5) Biweekly seminar on current topics. Required for students in the Graduate Program in Neurobiology and Behavior and for students supported on Graduate Neuroscience Program Training Grant. Credit/no credit only. Offered: AWSpS.

NEUBEH 515 Teaching Practicum in Neurobiology and Behavior (3-6, max. 15)
Supervised training in the teaching of neuroscience and related scientific topics. Prerequisite: graduate standing in the Neurobiology and Behavior graduate program and permission of the instructor. Offered: AWSpS.

NEUBEH 526 Introduction to Laboratory Research in Neurobiology (4) Students become familiar with, and assist in, the performance of research on ongoing projects in designated laboratories. Emphasis on employed methodology and techniques. Credit/no credit only. Prerequisite: first-year graduate students in neurobiology. Offered: AWSpS.

NEUBEH 527 Current Topics in Neurobiology and Behavior (1) Presentation and discussion of current research provides exposure to diverse areas of neurobiology and behavior research. Credit/no credit only. Prerequisite: graduate student in neurobiology and behavior program or permission of instructor. Offered: AWSpS.

NEUBEH 528 Computational Neuroscience (3)
Introduction to computational methods for understanding nervous systems and the principles governing their operation. Topics include representation of information by spiking neurons, information processing in neural circuits, and algorithms for adaptation and learning. Prerequisite: elementary calculus, linear algebra, and statistics, or by permission of instructor. Offered: jointly with CSE 528.

NEUBEH 532 Discussion in Cell Signaling and Molecular Physiology (2) Discusses fundamental issues in cell excitability and molecular and cellular physiology. Focuses on problem solving and reading from original literature. Emphasizes student participation. Prerequisite: first-year graduate students in neurobiology or physiology and biophysics. Offered: jointly with P BIO 532; A.

NEUBEH 541 Neuroendocrinology (3) *Steiner* Emphasizes the cellular and molecular aspects of several topics in neuroendocrinology, including neuropeptide genes, reproduction, steroid hormone regulation of gene expression, mechanisms of hormone action, endocrine rhythms, and neural oscillations. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 180, BIOL 200, and BIOL 220; BIOC 440, BIOC 441, BIOC 442 or permission of instructor. Offered: jointly with P BIO 509; W, odd years only.

NEUBEH 545 Quantitative Methods in Neuroscience (3) *Rieke, Shadlen* Discusses quantitative methods applicable to the study of the nervous system. Revolves around computer exercises/discussion of journal papers. May include linear systems theory, Fourier analysis, ordinary differential equations, stochastic processes, signal detection and information theory. Prerequisite: NEUBEH 501, 502, 503, or by permission of instructor. Offered: jointly with P BIO 545;W.

NEUBEH 549 Molecular Basis of Neurodegenerative Disease (2) *La Spada, Muchowski, Pallanck* Introduces a broad range of neurodegenerative diseases, focusing upon the approaches that have led to recent discoveries and emphasizing the elucidation of mechanisms and pathways of disease pathogenesis. Offered: jointly with GENOME 549/PHCOL 549; W.

NEUBEH 550 Biophysics of Calcium Signaling (1) *Hille, Santana* Introduction to cellular calcium signaling including theoretical and technical issues of calcium signal detection and biological conclusions. Prerequisite: CONJ 531 Offered: jointly with P BIO 550; odd years; Sp.

NEUBEH 551 Mouse Models (1) Illustrates the use of transgenic and targeted-gene disruption technologies for developing mouse models of the disease. Introduces the methodology of producing transgenic and knock out mice. Discusses several examples of disease models using the most recent primary literature as a source. Offered: jointly with P BIO 551.

NEUBEH 552 Synaptic Integration (1) *Binder, Powers* Discussion of recent papers on how neurons in the central nervous system integrate concurrent synaptic inputs. Includes: effects of driving force on synaptic currents, effects of conductances on dendritic properties, transfer of currents from dendrites to soma, and transformation of currents into spike train outputs. Offered: jointly with P BIO 552.

NEUBEH 553 Learning and Memory: Synapses and Systems (2) *Jagadeesh, Sullivan* Five-week mini-course evaluates the current state of knowledge on the mechanisms that allow people to learn and remember. After introductory overviews of the cellular and molecular mechanisms underlying long-term synaptic plasticity and the multiple systems existing for learning and memory, students choose specific topics for discussion. Offered: jointly with P BIO 553.

NEUBEH 554 Motor Learning: Cellular and Network Mechanisms (1) *Fetz, Perlmutter* Five-week mini-course reviews the current state of research on cellular and network mechanisms of motor learning. After an introductory overview of behavioral and physiological examples of motor learning in various species and systems, students choose specific topics for discussion, using the primary literature as a source. Offered: jointly with P BIO 554.

NEUBEH 555 Sensory Receptors (1) *Detwiler, Rieke* Five-lecture mini-course examines how different kinds of sensory receptors detect and respond to different modalities of sensory stimuli. Discussion focuses on the cellular and molecular mechanisms of the underlying transduction processes and the experimental evidence that they are based on. Offered: jointly with P BIO 555.

NEUBEH 556 Axon Pathfinding Mechanisms (1) *Bothwell* Examines mechanisms governing axon growth cone behavior during embryonic development and during regeneration in the injured adult. Discusses approaches employing both invertebrate and vertebrate model systems. Offered: jointly with P BIO 556.

NEUBEH 557 Ion Channel Gating (1) *Gordon, Zagotta* Compares and contrasts mechanisms of gating in ligand-gated and voltage-gated ion channels. Covers basics of ligand gating and voltage gating, kinetic schemes, inactivation and desensitization, gating currents and partial agonists, and ion channel structure. Offered: jointly with P BIO 557.

NEUBEH 600 Independent Study or Research (*, max. 10) Credit/no credit only. Offered: AWPpS.

NEUBEH 700 Master's Thesis (*, max. 10) Offered: AWPpS.

NEUBEH 800 Doctoral Dissertation (*, max. 10) Offered: AWPpS.

Nutritional Science

NUTR 300 Nutrition for Today (3) *NW Bruemmer* Science of nutrition as it relates to individual food choices, health behaviors, public health. Health topics include wellness, obesity, eating disorders, sports nutrition, prevention of chronic disease. Nutrients and nutritional needs across the lifespan. Issues facing society including food safety, biotechnology, use of supplements and botanicals. Offered: A.

NUTR 405 Phys Activity in Health and Disease (3) *Duncan* Impact of physical activity on individual and public health. Overview of physiological adaptations to activity, exercise prescription, exercise epidemiology, and prevention of chronic diseases. Public health recommendations for activity in the U.S. population, and the effects of the build environment on activity. Prerequisite: BIOL 118. Offered: jointly with EPI 405; Sp.

NUTR 441 Chemistry of Foods (3) *Peck* Principles of food science integrated with laboratory sessions that observe the effects of various parameters of food composition, and applied sensory evaluation. Explores current trends in the culinary sciences to promote pleasurable eating. Recommended: general and organic chemistry. Offered: even years; S.

NUTR 445 Food Safety and Production Laboratory (2) *Peck* Examination of food safety systems including HACCP methodology. Experiential study of food production, receiving systems, inventory control, menu planning, budget consideration, and cost control. Offered: W.

NUTR 462 Medical Nutrition Therapy I (2) *Peck* Intervention strategies, counseling skills, and diet modifications that pertain to chronic disease prevention and management. Corequisite: NUTR 562. Offered: Sp.

NUTR 463 Medical Nutrition Therapy II (2) *Peck* Didactic training in nutrition support theories and skill development for interpretation of laboratory values. Management of fluids and electrolytes, and nutrition interventions in acute care. Prerequisite: .NUTR 462; corequisite: 563. Offered: S.

NUTR 465 Nutritional Anthropology (3) I&S/NW *Shell-Duncan* Concerns interrelationships between biomedical, sociocultural, and ecological factors, and their influence on the ability of humans to respond to variability in nutritional resources. Topics covered include diet and human evolution, nutrition-related biobehavioral influences on human growth, development, and disease resistance. Prerequisite: BIO A 201. Offered: jointly with BIO A 465.

NUTR 499 Undergraduate Research (1-5, max. 10) Independent study and research supervised by a faculty member with appropriate academic interest. Offered: AWPpS.

NUTR 500 Graduate Seminar: Current Issues in Nutrition (1, max. 4) A review of current topics in nutritional science and public health nutrition. Provides a forum for student and faculty presentation, and review of current research efforts. Prerequisite: graduate student in nutrition. Offered: AWPpS.

NUTR 505 Phys Activity in Health and Disease (3) *Duncan* Impact of physical activity on individual and public health. Overview of physiological adaptations to activity, exercise prescription, exercise epidemiology, and prevention of chronic diseases. Public health recommendations for activity in the U.S. population, and the effects of the build environment on activity. Prerequisite: BIOL 118. Offered: jointly with EPI 502; Sp.

NUTR 526 Maternal and Infant Nutrition (3) *Johnson* Influence of maternal and infant nutrition on the health of populations. Nutrition-related physiological, psychological, and social factors in pregnancy, lactation, and infancy. Application of evidence-based approaches to maternal and infant nutrition recommendations and interventions for populations and high-risk individuals. Prerequisite: human nutrition and human physiology. Offered: A.

NUTR 527 Nutrition: Childhood Through Adolescence (3) *Rees, Trahms* Interactions of nourishment with behavior, growth, and development of children, from infancy through adolescence. Critical evaluation of normative data and special problems, as well as strategies for individual and public health interventions. Prerequisite: graduate student in nutritional sciences or permission of instructor. Offered: even years; Sp.

NUTR 528 Nutrition in Aging (3) *Drewnowski* Physiological, psychological, social, cultural, and economic factors affecting health nutrition and status in the middle and later years. Prerequisite: human nutrition and human physiology. Offered: odd years; Sp.

NUTR 529 Nutrition Research Design (3) *Duncan* Critical review of selected nutrition literature. Evaluation of experimental design, research protocols, data analyses, and data presentations. Prerequisite: BIOST 511. Offered: odd years; W.

NUTR 530 Nutrition for Children with Special Health Care Needs (3) *Lucas* Principles of nutrition screening and assessment, clinical nutritional care, family-centered care, and health services as applied to meeting nutritional needs of children with special health care needs. Both population-based and individual care concepts are explored for children with a variety of chronic conditions. Offered: odd years; Sp.

NUTR 531 Public Health Nutrition (4) *Johnson* Explores the functions and essential services of public health as they apply to assuring access to a safe and nutritious food supply. Examines the practice of public health nutrition: nutrition environment, program planning, implementation, and evaluation; policy development, implementation and evaluation, and links between basic science and public health nutrition practice. Prerequisite: introductory nutrition. Offered: Sp.

NUTR 532 Fieldwork in Public Health Nutrition (1-12, max. 12) *Peck* Experience and service learning in organizations that plan, deliver, and promote population-based nutrition education and nutrition services. Prerequisite: Nutritional Sciences graduate student and permission of instructor. Offered: AWPpS.

NUTR 537 Laboratory Rotation (1-4, max. 6) Exposure to research being conducted in the laboratories of the graduate nutrition faculty. Provides hands-on experience in laboratory research. Introduces the student to on-going research for preparation of dissertation topics. Prerequisite: permission of instructor. Offered: AWPpS.

NUTR 538 Nutritional Epidemiology (3) *Beresford, Drewnowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 and BIOST 511 or permission of instructors. Offered: jointly with EPI 538; A.

NUTR 539 Nutrition Journal Club (1-3, max. 9) *Duncan* Critical evaluation of research on selected topics in the field of nutrition. Credit/no credit only. Prerequisite: graduate student in nutrition. Offered: AWPpS.

NUTR 545 Food Safety and Health (3) *Bruemmer* Presentation of emerging issues in food safety, sustainable agriculture and biotechnology. Examines both domestic and global pressures on the food supply. Examines international policies that promote regional solutions for a safe food supply and access to nutritious foods. Recommended: course in microbiology. Offered: W.

NUTR 551 Nutrition and Gene Expression (3) *Rosenfeld* Lectures, student presentations, and discussions of current research on nutrient:gene

interactions. Focus on how dietary factors act both directly as transcriptional regulators or indirectly as inducers of signal transduction cascades leading to alterations in expression of proteins associated with cellular nutrient metabolism. Prerequisite: NUTR 520, NUTR 521, NUTR 522, or permission of instructor. Offered: W.

NUTR 555 Nutrition in Developing Countries (3) *Bruemmer, Gorstein* Introduces issues of nutrition in developing countries, with an emphasis on the control and prevention of under nutrition and micronutrient deficiencies. Offered: jointly with HSERV 540; Sp.

NUTR 561 Dietetics Internship (6-10, max. 30) *Peck* Focuses on the competencies for entry-level practice in dietetics. Autumn and winter quarters include core experiences in wellness, public health, food service, ambulatory care, home health, and clinical services. Spring quarter activities are devoted to either nutrition therapy or public health, depending on student's career goals. Prerequisite: clinical students only. Offered: AWSp.

NUTR 562 Nutrition and Chronic Disease (4) *Bruemmer, Drewnowski* Epidemiology/pathophysiology of chronic disease related to nutrition (e.g., obesity, cardiovascular disease, osteoporosis, hypertension, diabetes). Examines nutritional risk/protective factors in relation to public health, individual nutrition, and clinical intervention. Prerequisite: physiology, biochemistry. Offered: Sp.

NUTR 563 Nutrition in Acute Care (4) *Bruemmer, Peck* Assessment of the nutritional demands and hypermetabolic response of trauma, surgery, organ failure, burns, AIDS, and neoplastic disease. Examines specialized nutritional support and substrate requirements in the acute care setting. Prerequisite: NUTR 562, or permission of instructor. Offered: S.

NUTR 564 Management of Nutrition Services (4) *Bruemmer* Policy and administrative issues that impact delivery of nutrition services in health care environments. Topics include organization behavior, productivity, financial environments, clinical management, and human resources. Offered: odd years; S.

NUTR 581 Strategies of Health Promotion (4) *Bowen* Assessment of health promotion planning, implementation, and evaluation strategies for their strengths, weaknesses, and effectiveness. Students critique strategies to modify behavioral factors that influence lifestyles of individuals, including decisions influencing their reciprocal relationship with environmental factors affecting the health of individuals, organizations, and communities. Offered: jointly with HSERV 581. Prerequisite: HSERV 511. Offered: Sp.

NUTR 595 Nutritional Sciences Master's Practicum (1-12, max. 12) *Peck* Supervised practice experience providing students an opportunity to learn how nutritional sciences are applied to public health settings and in the formulation and application of public health policy. Credit/no credit only. Prerequisite: HSERV 511; NUTR 531; EPI 511; NUTR 520; 521; 522. Offered: AWSpS.

NUTR 600 Independent Study or Research (*) Offered: AWSpS.

NUTR 700 Master's Thesis (*) Offered: AWSpS.

NUTR 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Quantitative Ecology and Resource Management

QERM 502 Statistical Consulting for the Life Sciences (1-4) *Conquest* Consulting experience in data analysis, applied statistics, experimental design, parameter estimation, and sampling. Student provides consultation services to students and faculty. Students spend one classroom hour per week under faculty supervision discussing problems encountered. Prerequisite: QERM 482, QERM 483, STAT 421, STAT 423, or BIOST 514, BIOST 515, or equivalents, and permission of instructor. Offered: W.

QERM 514 Analysis of Ecological and Environmental Data I (4) *Conquest* Overview of generalized linear models (GLMs), their use in forestry, fisheries, wildlife ecology, and environmental monitoring. Analysis of the statistical tests that fall under GLMs: chi-square tests on contingency tables, t-tests, analysis of variances, etc. Statistical software S+/R used throughout. Offered: Sp.

QERM 521 Scientific Method in Resource Management (4) *Ford* Describes process of scientific discovery and strategies used for problems in ecology and natural resources management. Relationships between growth and use of objective knowledge in natural resources management is explored through case studies.

QERM 550 Ecological Modeling and Spatial Analysis (5) *Ford* Describes the principles of ecological modeling, and theoretical and methodological issues involved in their design and implementation. Emphasizes the analysis of spatial processes and how such analyses are used in developing ecological models. Students make and analyze a spatial process and/or construct a model of their own choice. Offered: W.

QERM 551 Modeling Organism Dynamics (3) *Anderson* Application of techniques of stochastic differential equations, time series analysis, and

simulating dynamic processes to plant and animal growth.

QERM 597 Seminar in Quantitative Ecology (2) Current topics in quantitative ecology and resource management. Fisheries, forestry, and marine resources. Offered: ASP.

QERM 598 Special Topics in Quantitative Resource Management (1-3, max. 12) Population and community ecology, systems ecology, and physical processes in ecosystems. Prerequisite: permission of instructor.

QERM 599 Research in Quantitative Resource Management and Ecology (*, max. 12) Topics can be theoretical in nature or combined theory and experiment. Research might be a prelude to thesis or dissertation research. Credit/no credit only.

QERM 600 Independent Study or Research (*).

QERM 700 Master's Thesis (*).

QERM 800 Doctoral Dissertation (*).

Quaternary Sciences

QUAT 417 Environmental Change in the Glacial Ages (3) NW *Porter* Physical, biological evidence of climatic change during Quaternary Period; emphasizing stratigraphy, chronology. Impact of alternating glacial/interglacial cycles on earth's terrestrial, marine environments. Theories on causes of climatic variation. Offered: jointly with ESS 433.

QUAT 501 Seminar/Conference in Quaternary Environments (1, max. 6) Interdisciplinary seminar or conference in the changing natural environments of the Quaternary Period, with emphasis on climatic changes and their effects. Speakers from the University and elsewhere present lectures on their specialties, followed by discussion. Credit/no credit only.

QUAT 502 Interdisciplinary Quaternary Investigations (2, max. 6) Research course for interdisciplinary investigation of Quaternary problems. Student attends sessions of QUAT 501 and pursues a problem-oriented case study concurrently under faculty direction. Required paper on case study. Credit/no credit only. Prerequisite: graduate standing.

QUAT 504 Special Topics in Quaternary Sciences (1-3, max. 3) Environments and climate changes of past two million years (Quaternary Period) in context of modern surface processes, including historical changes, prehistorical environments of postglacial period, and Ice Age events. Provides scientific perspective on scale of modern and man-made environmental changes, including those of climate, in context of recent earth history. Credit/no credit only. Prerequisite: background courses in earth sciences and ecology.

Interschool or Intercollege Programs

Bioengineering

BIOEN 201 Bioengineering Laboratory (2)

Caster Introduction to bioengineering; laboratory safety, acquisition and analysis, presentation tools for biomedical applications. Prerequisite: MATH 124; PHYS 121. Offered: W.

BIOEN 299 Introduction to Bioengineering (1)

Verdugo Lectures on the various aspects of bioengineering; orientation in bioengineering studies and practice. Credit/no credit only. Offered: ASp.

BIOEN 301 Bioengineering Systems Analysis (4)

Spelman Investigates static and dynamic problems that are found in medicine and biology. Exposes students to real biomedical applications of first- and second-order differential equations. Students analyze current bioengineering and biomedical problems and make measurements of the systems that present those problems. Weekly laboratories. Prerequisite: BIOL 200 or BIOL 202; E E 215. Offered: Sp.

BIOEN 302 Introduction to Biomedical Instrumentation (4)

Folch Introduces students to the theory of measurement and the practicalities of measurement of biological variables. Basic amplifier theory, discussion of noise in physical systems and its reduction. Some actuators used to test biomedical systems. Prerequisite: BIOEN 301; CSE 142. Offered: A.

BIOEN 303 Bioengineering Signal Processing (4)

Li, Vicini Introduction of signal processing techniques necessary to record and analyze medical and biological data. Students use transform calculus to analyze differential equations and develop approximations to functions. Introduces sampling and applies it to biological data. Prerequisite: BIOEN 302. Offered: W.

BIOEN 304 Introduction to the Bioengineering Analysis of Physiology I (4)

Pollack Introduction of engineering analysis of physiological systems. Course covers cellular function through its control by the central nervous system. Prerequisite: BIOEN 301; CSE 142. Offered: A.

BIOEN 305 Introduction to the Bioengineering Analysis of Physiology II (4)

Martyn Introduction to the cardiovascular system. Explores the cardiovascular system as an engineering system in which the heart is a pump, and the load and distribution of blood to organs on the heart depend on the demands of the system. Introduces principles of fluid transport. Prerequisite: BIOEN 302; BIOEN 304. Offered: W.

BIOEN 357 Introduction to Molecular Bioengineering (4)

Vogel Introduces molecular bioengineering. Molecules as building blocks to engineer surfaces. Molecular therapeutics, drug delivery, diagnosis and biomaterials. Examines design principles for biomedical materials and devices. Prerequisite: either BIOL 200 or BIOL 202; PHYS 122; either CHEM 223, CHEM 237, or CHEM 335. Offered: W.

BIOEN 420 Medical Imaging (4)

Kim, Yuan Various medical imaging modalities (x-rays, CT, MRI, ultrasound, PET, SPECT, etc.) and their applications in medicine and biology. Extends basic concepts of signal processing (BIOEN 303)

to the two and three dimensions relevant to imaging physics, image reconstruction, image processing, and visualization. Prerequisite: BIOEN 303; MATH 308; CSE 143. Offered: A.

BIOEN 436 Medical Instrumentation (4)

Introduction to the application of instrumentation to medicine. Topics include transducers, signal-conditioning amplifiers, electrodes and electrochemistry, ultrasound systems, electrical safety, and the design of clinical electronics. Laboratory included. For juniors, seniors, and first-year graduate students who are preparing for careers in bioengineering, both research and industrial. Offered: jointly with E E 436; Sp.

BIOEN 440 Introduction to Biomechanics (4)

Sanders Presents the mechanical behavior of tissues in the body and the application to design of prostheses. Tissues studies include bone, skin, fascia, ligaments, tendons, heart valves, and blood vessels. Discussion of the structure of these tissues and their mechanical response to different loading configurations. An important part of the class is a final project. Offered: jointly with M E 445; Sp.

BIOEN 455 BioMEMS (4)

Folch Introduction to BioMEMS. State-of-the-art techniques in patterning biomolecules, machining three-dimensional microstructures and building microfluidic devices. Various biomedical problems that can be addressed with microfabrication technology and the engineering challenges associated with it. Biweekly labs. Prerequisite: BIOEN 303. Offered: Sp.

BIOEN 457 Advanced Molecular Bioengineering (4)

Stayton Fundamentals of molecular recognition: thermodynamics, forces, kinetics. Manipulation of recognition processes for current molecular bioengineering research and development. Fundamental physical chemistry of molecular recognition in the context of biomedicine. Therapeutics based on cells. Prerequisite: BIOEN 357; BIOC 405. Offered: Sp.

BIOEN 467 Biochemical Engineering (3)

Baneyx Application of basic chemical engineering principles to biochemical and biological process industries such as fermentation, enzyme technology, and biological waste treatment. Rapid overview of relevant microbiology, biochemistry, and molecular genetics. Design and analysis of biological reactors and product recovery operations. Prerequisite: either CHEM 223 with CHEM E 340 or either CHEM 237 or CHEM 335; recommended: CHEM E 465. Offered: jointly with CHEM E 467; W.

BIOEN 470 Systems Engineering and Electronic Medicine (4)

Kim Provides students with understanding and hands-on experience in systems engineering, healthcare information systems, and core technologies for electronic medicine; including how large-scale engineering systems are defined, architected, built, and tested. Focus is on current and future medical systems. Prerequisite: BIOEN 303; MATH 308. Offered: W.

BIOEN 481 Research and Design Fundamentals (4)

Engineering design, planning and managing an open-ended project, bioengineering and society. Prerequisite: BIOEN 303; BIOEN 305. Offered: AWSPS.

BIOEN 482 Bioengineering Senior Capstone Research/Design ([2-6]-, max. 8)

Independent capstone design/research project; final paper. Prerequisite: BIOEN 303; BIOEN 305. Offered: AWSPS.

BIOEN 485 Computational Bioengineering (4)

Vicini Introduction to computational, mathematical and statistical approaches to the analysis of biological systems, including systems and control theory, molecular models and bioinformatics. Lectures and laboratory sessions emphasize practical problems in kinetics, metabolism and genomics. Prerequisite: CSE 143; BIOEN 305; MATH 308. Offered: W.

BIOEN 490 Engineering Materials for Biomedical Applications (3)

Bonadio, Horbett Combined application of principles of physical chemistry and biochemistry, materials engineering, to biomedical problems and products. Applications include implants and medical devices, drug delivery systems, cell culture processes, diagnostics, and bioseparations. Offered: jointly with CHEM E 490; Sp.

BIOEN 491 Controlled-Release Systems: Principles and Applications (3)

Hoffman Mechanisms for controlled release of active agents and the development of useful drug delivery systems for this purpose. Release mechanisms considered include diffusive, convective, and erosive driving forces. Delivery routes include topical, oral and in vivo. Some special case studies covered in detail. Offered: jointly with CHEM E 491; even years; W.

BIOEN 492 Surface Analysis (3)

Ratner Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials, science wear, and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger): ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 458; W.

BIOEN 497 Bioengineering Education Outreach (1-2, max. 6)

Work with K-12 schools or community organizations. Current science education research and instructional techniques. May involve presentations or instruction in hands-on activities. Offered: ASp.

BIOEN 499 Special Projects (2-6, max. 6)

Individual undergraduate bioengineering projects under the supervision of an instructor. In addition, classes on selected topics of current interests as announced. Offered: AWSPS.

BIOEN 508 Physical Aspects of Medical Imaging (4)

Stewart Quantitative physical principles of medical imaging are presented for electromagnetic and sonic radiation. Methods of image formation and analysis are discussed for conventional film radiography, CT, DSA, PET, B-mode ultrasound and Doppler ultrasound. Offered: jointly with RADGY 508/ENV H 528; W.

BIOEN 510 Bioengineering Seminars (1)

Introductory seminar for new graduate students; review of departmental research.

BIOEN 511 Biomaterials Seminar (1)

Hoffman, Horbett, Ratner Presentation of student research results. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 511; AWSp.

BIOEN 520 Orthopedic Biomechanics (4)

Ching Mechanical engineering applied to musculoskeletal system with emphasis on techniques in orthopedic surgery. Measurement of mechanical properties of tissues. mechanics of bone, soft tissue, and muscle, mechanics of upper extremity, spine, and lower extremity. Engineering in surgery, gait analysis, joint replacement, fracture fixation. Prerequisite: BIOEN 440. Offered: odd years; W.

BIOEN 540 Biosystem Identification (4) *Vicini*

Fundamentals of mathematical modeling in medicine and biology. Introduction to compartmental models: a priori, a priori identifiability. Data measurement error, parameter estimation. Maximum likelihood, least squares. Introduction to tracer-tracee models, pharmacokinetics, pharmacodynamics. Models to test hypotheses. Hands-on computer experience. Prerequisite: ordinary differential equations, introductory statistics, or permission of instructor. Offered: even years; A.

BIOEN 542 Computer Simulation in Biology (3) *Bassingthwaighte, Graham*

Introduction to mathematical modeling of biological phenomena. Tutorial text explains how to derive equations for simple models and apply them to generate simulation data. Application topics include kinetics of biomolecular reactions and enzyme saturation, membrane transport, organismal predation, competition and growth, compartmental and spatially distributed models, physiological control systems, probabilistic models. Prerequisite: P BIO 405 and P BIO 406 or equivalent or permission of instructor. Offered: even years; A.

BIOEN 545 Fractals in Biology and Medicine (3) *Bassingthwaighte*

Introduction to fractal and chaos. Conceptual approaches to using fractals for characterizing structures and growth processes, describing heterogeneities, and evaluating properties of tissues. The behavior of non-linear systems, often chaotic, describes physiological homeodynamics, regulation without set points in feedback control. .

BIOEN 550 Mass Transport and Exchange in Biological Systems (3) *Bassingthwaighte*

Review of basic mechanisms of transport; transport through vascular system and blood-tissue exchange processes in organs; integrated system analysis of closed systems and applications to physiological regulation, medical imaging, and pharmacokinetics. Prerequisite: calculus, introduction to differential equations; cardiovascular physiology; E E network analysis or systems analysis, chemical engineering transport. Offered: Sp.

BIOEN 555 Introduction to Biomechanics (3)

Pollack Mechanical properties of biological tissues, with emphasis on the underlying histological bases. Bones, joints, cartilage, blood vessels, connective tissue, muscle, heart. Many laboratory sessions. Offered: odd years; W.

BIOEN 560 Ultrasound in Bioengineering (4)

Vaezy Fundamentals of ultrasonic generation, formation, reception, and treatment of absorption, scattering, and transmission. Conventional and new methodology. (A, B, T-M mode, imaging, Doppler, tissue characterization, and nonlinear effects.) Prerequisite: E E/M E 525 for nonbioengineering students or permission of instructor. Offered: odd years; Sp.

BIOEN 561 Biomedical Optics (4) Advanced theories of optical and spectroscopic measurement with emphasis on biomedical laser

applications. Laser principles, instrumentation, and current practice in various biomedical uses, covering such areas as medicine, surgery, and biology. Prerequisite: BIOEN 302 or equivalent, or permission of instructor. Offered: even years; Sp.

BIOEN 565 Nuclear Magnetic Resonance in Biomedicine (2)

Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with RADGY 550; odd years; W.

BIOEN 568 Image-Processing Computer Systems (4) *Kim*

Components of digital processing computer systems. Two-dimensional filtering and optimal filter design as well as basic image-processing operations. Selected advanced image-processing topics introduced. Individual student project. Prerequisite: permission of instructor. Offered: jointly with E E 568; Sp.

BIOEN 571 Polymeric Materials (3) *Ratner*

Relationships between configuration, conformation, molecular order, microstructure, properties of polymeric materials. Concepts relevant to tailoring polymer molecules and microstructures for specific applications. Interactions between polymers and their in-service environment. Characterization and processing techniques relevant to polymeric materials. Prerequisite: one semester or two quarters of organic chemistry. Offered: jointly with MSE 571.

BIOEN 573 Biosensors and Biomedical Sensing (3) *Yager*

In-depth overview of the principal types of biosensors. Topics include: how biological molecules are used in sensing, how the sensors operate, how different sensors compare, under what circumstances sensors can be useful, and the applicability of sensors to biomedical sensing. Prerequisite: BIOEN 436 or permission of instructor. Offered: odd years; A.

BIOEN 575 Molecular Modeling Methods (4)

Beard Introduction to theory and practice of computer simulation studies of molecules with emphasis on applications to biological molecules and complexes. Discussion of background theory, implementation details, capabilities and practical limitations of these methods. Prerequisite: previous coursework in biochemistry and physical chemistry and/or permission of instructor. Offered: jointly with CHEM 575; A.

BIOEN 576 Laboratory Techniques in Protein Engineering (4) *Stayton*

Practical introduction to fundamentals of recombinant DNA technology and protein engineering. Gene design, bacterial molecular biology, genetic engineering strategy. Laboratory project focused on making site-directed protein mutations. Techniques include the Polymerase Chain Reaction, DNA sequencing, DNA cutting/splicing, protein expression. Prerequisite: background in biochemistry or molecular biology or consent of instructor. Offered: W.

BIOEN 577 Cell and Protein Reaction with Foreign Materials (3) *Horbett*

Study of ways in which cell and protein interactions with foreign materials affect the biocompatibility of biomaterials. Description of the phenomenology and mechanisms of protein adsorption, mammalian cell adhesion, and cell receptor

biology and of methods used to study these phenomena. Surface properties of materials discussed in context of the course. Prerequisite: permission of instructor. Offered: even years; A.

BIOEN 578 Biomembranes (3) *Yager*

Develops an understanding of the molecular principles that underlie the self-assembly of surfactants into natural and model membranes; in particular, on the relationship between the chemical structure of lipid molecules and the three-dimensional aggregates that they form in water Offered: A.

BIOEN 579 Host Response to Biomaterials (3) *Giachelli*

Basic cell and molecular biology of the pathologies associated with biomaterial implantation that limit bioprosthetic use, including hemostasis, infection, acute and chronic inflammation, wound healing and fibrosis, and structural alterations. Major methods for histological analysis of retrieved implants. Prerequisite: general biology, BIOEN 490 (may be taken concurrently) or permission of instructor. Offered: odd years; W.

BIOEN 584 Computational and Integrative Bioengineering (4) *Vicini*

Advanced computational, mathematical, and statistical approaches to the analysis of biological systems, including molecular models, time series, fractal systems, population kinetic analysis, and stochastic simulation. Lectures and laboratory sessions emphasize practical problems in kinetic analysis, metabolism, and genomics. Final project, written and oral reports. Prerequisite: BIOEN 485. Offered: odd years; Sp.

BIOEN 588 Bioengineering Principles of Physiology (4) *Bonadio, Kushmerick*

Muscle exemplifies: protein-protein interactions; molecular recognition; proteins as machines; functional scaling; computing and signaling with metabolic machines; metabolic processes as chemical networks; membrane separation into functions; channels as communication machines; neural control and function. Prerequisite: BIOL 200 or equivalent or permission of instructor; recommended: BIOEN 304, P BIO 405. Offered: A.

BIOEN 589 Integrative Physiological Systems Analysis (4) *Bassingthwaighte*

Physiological systems, emphasizing cardiovascular, pulmonary and to a lesser extent, renal, hepatic, and endocrine systems, described in quantitative terms, using model representation for examples and problems. Laboratories. Prerequisite: BIOEN 588, calculus and ordinary differential equations. Offered: W.

BIOEN 590 Advanced Topics in Biomaterials (3) *Bonadio*

Major, controversial issues in application of synthetic materials to medical problems. Blood compatibility, bioadhesion, intraocular lenses, contact lenses, polyurethanes, biodegradation, protein adsorption, corrosion, bone fixation, new materials, artificial heart, medical device regulation. Prerequisite: BIOEN 490 or CHEM E 490. Offered: jointly with CHEM E 590; odd years; Sp.

BIOEN 592 Surface Analysis (3) *Ratner*

Understanding of solid surfaces for research and development in microelectronics, catalysis, adhesion, biomaterials science, wear and corrosion science. Newer methods available to study surfaces of materials. Electron emission spectroscopies (ESCA, Auger); ion scattering, ion spectroscopic, photon spectroscopic, and thermodynamic methods. Offered: jointly with CHEM E 558; W.

BIOEN 599 Special Topics in Bioengineering (1-6, max. 15) Offered at a graduate level periodically by faculty members within the Department of Bioengineering; concerns areas of research activities with current and topical interest to bioengineers. Prerequisite: undergraduate or graduate courses (or equivalent) determined individually for each special topic. Offered: AWPpS.

BIOEN 600 Independent Study or Research (*) Credit/no credit only. Offered: AWPpS.

BIOEN 700 Master's Thesis (*) Credit/no credit only. Offered: AWPpS.

BIOEN 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWPpS.

Quantitative Science

Q SCI 110 Introduction to Environmental Modeling (5) NW, QSR *Greulich, Bare, Francis* Introduction to the development and use of system models for studying the dynamics of natural and managed systems. Examines modeling process using natural resource management, environmental science, and biological examples. Uses STELLA software to illustrate systems concepts and to design, build, and explore model behavior.

Q SCI 291 Analysis for Biologists I (5) NW, QSR *Briggs, Greulich, Johnson* Introduction to differential calculus, emphasizing development of basic skills. Examples promote understanding of mathematics and applications to modeling and solving biological problems. Topics include optimization and curve analysis. Prerequisite: either MATH 120, a minimum score of 2 on advanced placement test, or a minimum score of 67% on MATHPC placement test. Offered: AWS.

Q SCI 292 Analysis for Biologists II (5) NW, QSR *Gallucci, Greulich, Johnson* Introduction to integral calculus, emphasizing development of basic skills. Examples promote understanding of mathematics and applications to modeling and solving biological problems. Topics include areas under curves, volumes, and differential equations. Prerequisite: Q SCI 291. Offered: WSpS.

Q SCI 293 Analysis for Biologists III (5) NW, QSR *Gallucci, Johnson* Additional topics in calculus and matrix algebra. Examples promote understanding of mathematics and applications to modeling and solving biological problems. Topics include infinite series, differential equations, vectors, functions of several variables, partial derivatives, and use of computer software. Prerequisite: Q SCI 292.

Q SCI 381 Introduction to Probability and Statistics (5) NW, QSR Applications to biological and natural resource problems stressing the formulation and interpretation of statistical tests. Random variables, expectations, variances, binomial, hypergeometric, Poisson, normal, chi-square, "t" and "F" distributions. Prerequisite: either MATH 120, 124, 125, 126, 144, or QSci 291 and QSci 291, a minimum score of 2 on advanced placement test, or a minimum score of 67% on MATHPC placement test. Offered: AWPpS.

Q SCI 392 Techniques of Applied Mathematics in Biology I (3) NW Ordinary differential equations-linear and nonlinear; systems of differential equations; approximation techniques,

numerical solution techniques; applications to biological processes. Prerequisite: Q SCI 292.

Q SCI 393 Techniques of Applied Mathematics in Biology II (3) NW Applications of advanced ordinary differential equations, special functions, and partial differential equations to descriptions of biological phenomena. Particular emphasis on transport in biological systems, including diffusion and fluid flow. Prerequisite: Q SCI 392.

Q SCI 456 Introduction to Quantitative Fishery Science (5) NW Conveys fundamental concepts of fish population dynamics and fishery management within context of real-world fisheries problems. Lectures discuss notation, terminology, mathematical models, fisheries principles, and case studies. Laboratory time devoted to practical applications, problems. Recommended: either MATH 125, MATH 135, or Q SCI 292; Q SCI 381. Offered: jointly with FISH 456; A.

Q SCI 458 Fisheries Stock Assessment (4) NW *Francis* Emphasizes quantitative analysis of fisheries data to determine how the fishery would respond to alternative management actions. Major topics include production models, stocks and recruitment, catch at age analysis, and formulation of harvest strategies. Recommended: either Q SCI 456 or FISH 456. Offered: jointly with FISH 458; Sp.

Q SCI 477 Quantitative Wildlife Assessment (5) NW *Skalski* Focuses on wildlife sampling techniques for estimating animal abundance, home range, and survival rates in terrestrial populations. The design of wildlife investigations for the purposes of impact assessment, research, and resource management is integrated with estimation schemes and demographic models in a quantitative framework. Prerequisite: Q SCI 292; Q SCI 482.

Q SCI 480 Sampling Theory for Biologists (3) NW *Gallucci, Rustagi* Theory and applications of sampling finite populations including: simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling, sample size determinations, applications in fisheries and forestry. Other topics include sampling plant and animal populations, sampling distributions, estimation of parameters and statistical treatment of data. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with STAT 480; even years.

Q SCI 482 Statistical Inference in Applied Research (5) NW Analysis of variance and covariance; chi square tests; nonparametric procedures multiple and curvilinear regression; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisite: either STAT 311 or Q SCI 381. Offered: AWS.

Q SCI 483 Statistical Inference in Applied Research (5) NW Analysis of variance and covariance; chi square tests; nonparametric procedures multiple and curvilinear regression; experimental design and power of tests. Application to biological problems. Use of computer programs in standard statistical problems. Prerequisite: either Q SCI 381 or Q SCI 482. Offered: W.

Q SCI 486 Experimental Design (3) NW Topics in analysis of variance and experimental designs: choice of designs, comparison of efficiency,

power, sample size, pseudoreplication, factor structure. Prerequisite: Q SCI 482; recommended: Q SCI 483. Offered: jointly with STAT 486.

Q SCI 497 Special Topics in Quantitative Science (1-15, max. 15) NW Topics not normally offered in regular curriculum. Format ranges from seminar/discussion, formal lectures, laboratory or modeling work. Offered: AWPpS.

Q SCI 498 Internship (1-15, max. 15) Internship experience with a public agency or private company, supervised and approved by a faculty member. Preparation of professional report reflecting on the experience is required. Credit/no credit only. Offered: AWPpS.

University Conjoint

UCONJ 100 Introduction to Health Professions (1) *Garcia* Opportunities in health professions. Information on educational requirements, professional/patient interaction, licensing, registering for practice in profession, salaries, and career opportunities.

UCONJ 290 Diversity Issues in the Health Care Environment (1-2, max. 2) I&S Introduction to the complexity of the issues surrounding culture and health, the interrelatedness of ethnic and cultural characteristics and health care access, health and health care concerns of specific communities, traditional and alternative health care practices, and community-based promotion and disease prevention programs.

UCONJ 410 Health in the Context of Italian Culture (5) While in Italy, participants study relationship between current health issues, contemporary Italian history, socio-cultural environment, and European Union; health status of vulnerable populations; characteristics of culture and health care system that promote healthy outcomes; differences between health behaviors and outcomes in Italy and US. Offered: A.

UCONJ 411 Psychology of Aging (3) *Kiyak* Focuses on developing the skills necessary for critically evaluating current psychological theories of aging, research findings in this area, and the implications of findings on the aging person. Special consideration given to the effects of socioeconomic, sex, and ethnic differences in the psychology of aging. Open to upper-division undergraduates and beginning graduate students interested in the field of gerontology.

UCONJ 412 The Family in Later Life (3) Focuses on issues affecting older persons and their families. Addresses demographic influences on families; roles, rules for and function of family members; inter-generational relationships; economics, political, and social policy affecting family life; and cultural variations and supportive resources for older persons and their families.

UCONJ 413 Current Issues in Aging (3) Describes the population trends at work in the United States and other developed nations with significant societal implications for care and management of elders. Evaluates selected public policies related to aging. Gives students proficiency in using resources related to aging on the Internet. Evaluates alternative long-term care models.

UCONJ 420 Biological Safety Practices (1) *Kenny* General introduction to appropriate

laboratory procedures used for handling potentially hazardous biological agents. Particular focus on laboratory safety and appropriate protocols that should be employed by those engaged in infectious disease and recombinant DNA research. Credit/no credit only.

UCONJ 422 Sexually Transmitted Diseases: An Overview (2) *Gardner* Clinically oriented course designed to provide a knowledge base for upper division health science students to participate effectively in community outreach programs for the prevention of sexually-transmitted diseases. Offered cooperatively by the departments of Pharmacy and Medicine.

UCONJ 440 Biological Aspects of Aging (3) Introductory course on aspects of the biology of human aging and of functional changes associated with normal aging and with those illnesses that may be present in the elderly. Focus on the relationship between changes in physical function, environment, and quality of life. Includes theoretical perspective on aging as well as the aging process in specific physiological systems. Designed for upper-level undergraduate students with an interest in aging.

UCONJ 442 Social and Cultural Aspects of Aging (3) Involves faculty members from the various social science fields examining the range and variation of relationships among age-linked attitudes and cultural values related to aging; the social and economic factors that influence the elderly in contemporary society; the effects of ethnic and sex differences in sociocultural aging. Open to upper-division undergraduates and beginning graduate students interested in gerontology.

UCONJ 443 Interdisciplinary Seminar on Aging (1-6, max. 15) *Borgatta* Interdisciplinary examination of the contemporary theoretical literature on gerontology and long-term care. For upper-level undergraduate and graduate students with an interest in aging. Quarterly offerings available from the Institute on Aging.

UCONJ 444 Interdisciplinary Collaborative Teams in Health Care (1-5, max. 10) Course open to students in UW Health Sciences schools. Students function as an interdisciplinary learning group within a problem based learning framework. The primary goal of the course is to promote the development of interdisciplinary practice in the care of urban and rural underserved patient populations. Credit/no credit only.

UCONJ 445 Bioterrorism Awareness for Health Professionals (1) Provides content in bioterrorism awareness for students in the health professions. First in a two-course interdisciplinary sequence focusing on awareness level training designed to enhance recognition of an injury of illness potentially arising as a result of exposure to select chemical and biological agents. Credit/no credit.

UCONJ 446 Bioterrorism Preparedness and Response for Health Professionals (2, max. 6) Focuses on bioterrorism preparedness and response for health professionals. Includes planning, system, and policy issues with an emphasis on clinical relevance. Content compliments UCONJ 445 (not a prerequisite).

UCONJ 450 Health Care in the Underserved Community (1) Recommended for students who are working with underserved communities. Students learn about the underserved population

served by the community health projects on campus with a focus on inter-professional patient care.

UCONJ 490 Social Sensitivity in Health Care (3) I&S Multidisciplinary course for health professions students. Health professionals' roles in dealing with social, cultural, and physical barriers to health care of low-income groups and ethnic people of color. Personal involvement through field experiences and faculty drawn from affected communities as well as health sciences, social work schools. Credit/no credit only.

UCONJ 497 Health Care in a Rural Community (3) Critical analysis built upon concepts relative to interdisciplinary health-care delivery in a rural community. Students develop an organizational model for rural health care and study innovative ways of mobilizing community resources and support for a comprehensive rural health-care system. Pharmacy students, nurses, and other health professionals study application of theory in an appropriate clinical setting within the conceptual framework of each student's professional field.

UCONJ 500 Seminar in Interprofessional Collaboration ([1-3]-, max. 7) Interdisciplinary teams composed of students and community members placed in diverse urban settings to address an identified community need by developing and implementing collaborative, community-based projects. Seminars emphasize interprofessional collaborative practice, intrapersonal understanding, interpersonal group process skills, organizational savvy, community awareness, and sociocultural sensitivity. Graduate School of Public Affairs. Offered: AWSp.

UCONJ 501 International Health (1) *Wade* Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UCONJ 502 International Health (1) *Wade* Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UCONJ 503 International Health (1) *Wade* Weekly seminar introduces students to issues and opportunities of participating in health care systems in other countries. Guest speakers bring many perspectives of international health care experiences. Class discussions help prepare students for international placements.

UCONJ 505 Professional Interpersonal Styles of Communication with Families to Enhance Health Outcomes (3) Complex communication processes evaluated and applied to the family as unit of interaction within interdisciplinary context. Empirical based communication practices analyzed considering family variables adherence, satisfaction, health outcomes, and cost effectiveness. Engagement in experiential learning through challenging clinical scenarios. Emphasizes cultural competencies. Prerequisite: professional student or permission of instructor.

UCONJ 510 Integrating Arts in the Classroom (4) Prepares prospective elementary education teachers to understand and acquire

arts literacy through a comprehensive approach to learning and teaching in and through the arts. Course is school and arts-site based, inclusive of multiple art forms. Based on comprehensive art principles, and project oriented. Credit/no credit only. Offered: Sp.

UCONJ 511 Issues in Home Health Care Delivery (3) Service delivery issues relevant to provision of health care services across the life span in the home setting. Home health care as an important component in health care system. Individual and multidisciplinary practice of health care disciplines. Emphasis on research literature. Prerequisite: graduate student standing, upper division with permission of instructor.

UCONJ 513 Dynamics of Patient Management: Diabetes Mellitus (2) Analysis of advanced knowledge related to interdisciplinary management of diabetes. Commonalities and differences in provider approaches, recent research and its effect on management practices, collaborative communication, knowledge application. Brief interactive presentations, decision-making opportunities, discussion. Credit/no credit only. Prerequisite: graduate standing in pharmacy, dietetics, nursing; third- or fourth-year medical student; or permission of instructor.

UCONJ 515 Promoting Health Behavior for Individuals and Families (2/4, max. 4) *Brandt, Jordan, Kieckhefer, Lewis, Solchany, Spieker* Practice-focused, evidence-based, theory-driven intervention strategies to promote healing and health behavior at selected points from birth to death. Relevant for clinicians from diverse health settings. Emphasis on clinical skill development including decision-making and outcome management applicable for individuals and families. Prerequisite: permission of instructor. Offered: Sp.

UCONJ 520 Molecular Biophysics Research Seminar (1) *Parson* A series of research seminars for faculty and students involved with the molecular biophysics program. Credit/no credit only.

UCONJ 524 Developmental Neurobiology (3) *Raible, Reh, Roelink, Rubel* Survey of contemporary issues in developmental neurobiology, including neurogenesis and differentiation; electrophysiological, morphological, and neurochemical regulation of cellular phenotype; neuronal pathways and synaptic contacts; cellular and synaptic plasticity; and behavior. Examination of molecular biological, morphological, electrophysiological, and behavioral approaches. Prerequisite: background in neurophysiology, neuroanatomy, molecular neurobiology. Offered: Sp.

UCONJ 525 Overview of Faculty Research in Neurobiology (1) Reviews research topics currently being studied in neurobiology. Student preparation consists of reading pertinent articles published on each topic. Credit/no credit only. Prerequisite: first-year graduate student in neurobiology.

UCONJ 530 Issues in Indian Health (3) Survey of historical and contemporary issues in Indian Health. Covers Indian contributions to health, traditional Indian Medicine, current disease epidemiology, development of Federal Indian Health policy, the Indian Health Service, tribal health programs, and consequences of major legislation on Indian Health. Prerequisite: current health science student or permission of instructor.

UCONJ 532 Introduction to Mind Body Medicine-An Experiential Elective (2) Sessions contain a didactic component followed by an experiential component and cover a variety of self-care techniques including meditation, exercise, and nutrition. The goals are to promote personal well being, a healthy lifestyle, reduce burnout, and reduce academic difficulties. Credit/no credit only.

UCONJ 540 Environmental Change and Human Health: The Role of the Health Professional (1/2, max. 2) *Oberle, Rosenblatt* Explores the effect of environmental deterioration on human health, and presents tools to address the problem. Offered: Sp.

UCONJ 548 Current Issues in First Nations Behavioral Health: Mental Health and

Substance Abuse (3) Historical and intergenerational antecedents of tribal psychiatric and substance abuse disorders. Oppression, economic circumstances, and family functioning as shaping mechanisms for attachment. Implications of insufficient attachment for neuro-development and developmental psychopathology. Traditional vs. mental health and substance abuse assessment and treatment. Self as provider to tribal clients, communities, systems.

CONJ 553 Clinical Management of HIV and STIs (3) Develops skills related to providing HIV/SDB healthcare through a Web-based curriculum and weekly seminar. Prerequisite: familiarity with principles of clinical care and the ability to perform a routine history and physical examination.

UCONJ 555 Principles of STD/HIV Research (3) Provides MD and PhD fellows and graduate students with a comprehensive overview of the current state of knowledge in specific areas of STD/HIV research, including study design, laboratory methods, production of instruments for data collection, and methods for data analysis. Credit/no credit only.

UCONJ 584 Plant Tumors (1, max. 9) *Gordon* Discussion of the literature of plant tumors and current research work being carried on in this area at the University. Offered cooperatively by the departments of Biochemistry, Botany, and Microbiology and Immunology. Credit/no credit only. Prerequisite: offered only to persons actively pursuing work in this area.

School of Law

Law

LAW 300 Introduction to Law (3-6, max. 5) I&S Understanding the legal system, its functions in the social-economic order, legal reasoning, and the world of legal education and the legal profession. Open to nonlaw students only.

LAW 410 Problems in Professional Responsibility (4) I&S .

LAW 415 Criminal Justice (3) I&S Examines pre-trial rights of persons suspected or accused of crime, primarily those rights covered by the Fourth, Fifth, Sixth, and Fourteenth Amendments of the U.S. Constitution.

LAW 416 International Contracting: Negotiation and Drafting (3) I&S Skills course designed to introduce process and problems of negotiating and drafting international agreements. Client interviewing and counseling and negotiation and drafting of a contract between parties in the United States and Japan. Credit/no credit only. Open to nonlaw students only.

LAW 422 Copyright (3) I&S .

LAW 429 Public Land Law (3) I&S .

LAW 440 Legal Issues of Internet Law (3) I&S Introduces the basic legal issues raised by networked digital technologies, such as the Internet. Covers jurisdiction, speech, privacy/access, propriety rights (copyrights, domain names), emerging law, leading policy debates, as well as fundamental Internet technical skills. Offered: S.

LAW 442 Land Law and the Urban Environment (3) I&S Examination of the major legal tools available to shape the urban environment by controlling the use of land. Considers zoning, subdivision controls, urban renewal, private land-use restrictions, and the rules of nuisance law. Credit/no credit only. Open to law and nonlaw students.

LAW 443 The Legal Process I (3/5) I&S The system of law and its functions rather than substantive law pertaining to any particular subject or discipline. Open only to nonlaw students. Credit/no credit only.

LAW 444 Constitution and American Public Education (3-6, max. 6) I&S Examines the relationships between the Constitution of the United States and the American system of public

education, excluding higher education, in areas of constitutional freedom and legal controls, racial desegregation, and equal educational opportunity, including equal financing of the public schools. Credit/no credit only. Offered: jointly with EDLPS 444.

LAW 445 Major Issues in American Constitutional Law (3) I&S Significant themes in American constitutional law. Doctrine of judicial review, application of the Bill of Rights to the states, Supreme Court's recognition of fundamental rights, the Equal Protection clause, the Religion clauses, freedom of speech, and Presidential powers. Open to law and nonlaw students.

LAW 447 Critical Perspectives in Law (3) I&S Examination of modern critical legal thought and critics views regarding proposed alternative forms of social ordering.

LAW 467 American Law and the American Indian (3) I&S Relationship between Indians and the United States from 1789 to the present. Significant constitutional, legislative, and judicial actions. Legal events explored within their political, military, social, and cultural contexts. Comparisons with other minority-group experiences. Offered: jointly with HSTAA 416.

LAW 476 International Economic Relations and Trade Policy (3) I&S Consideration of international control of national trade policies and permissible transnational reach of national trade or other regulation The General Agreement on Tariffs and Trade (GATT) and the international monetary system examined from legal and economic perspective. Examination and comparison of prescriptive jurisdiction to public international law.

LAW 477 Law Literature and Film (2-4, max. 4) I&S/VLPA An examination of literary and cinematic portrayals of and issues important to law, lawyers, and the legal system. Considers both portrayals purporting to depict the legal system as well as works envisioning lawyers and the legal system in a "better world."

LAW 481 Land, American Culture and the Law: Perspectives on the Use and Ownership of the Natural Environment (1-6, max. 6) I&S .

LAW 489 Law and Aging (3) I&S Survey of principal areas of law of special concern to aging population, considering health care and health care decision-making, public and private income

maintenance programs, taxation, guardianships, conservatorships and other methods of protecting the property of the elderly, counseling, and professional responsibility.

LAW 600 Independent Study or Research (*) .

LAW 800 Doctoral Dissertation (*) .

Law A

LAW A 501 Contracts ([2-8]-, max. 8) .

LAW A 502 Civil Procedure I ([2-6]-, max. 6) .

LAW A 503 Property I ([2-8]-, max. 8) .

LAW A 504 Torts ([2-8]-, max. 8) .

LAW A 505 Criminal Law ([2-5]-, max. 5) .

LAW A 506 Basic Legal Skills ([1-6]-, max. 6) .

LAW A 507 Constitutional Law I: Constitutional Structures of Government (4) .

LAW A 508 Payment Systems (3/4) .

LAW A 509 Administrative Law (3-4, max. 4) .

LAW A 510 Sales: A Comparative Perspective (3) .

LAW A 511 Transmission of Wealth (5) .

LAW A 512 Secured Transactions (3) .

LAW A 513 Creditor-Debtor Law ([2-3]-) .

LAW A 514 Corporations (3/4) .

LAW A 515 Business Organizations (5) .

LAW A 516 Legal Accounting (3) .

LAW A 517 Securities Regulations (4) .

LAW A 518 Restitution (3) .

LAW A 520 Property II ([2-8]-, max. 8) .

LAW A 521 Community Property (2/3) .

LAW A 522 Copyright (3/4) LAW A 523 Real Estate Transactions (3/4) .

LAW A 524 Private Land Development (3) .

LAW A 525 Water Law (4) .

LAW A 526 Copyrights and Trademarks (5) .

LAW A 527 Environmental Law: Pollution Control (4) .

LAW A 529 Public Land Law (3) .

LAW A 530 Basic Income Tax ([2-6]-, max. 6) .

LAW A 531 Death and Gift Taxation (2-5, max. 5) .

LAW A 532 Taxation of Business Entities (5) .

LAW A 535 Trademarks and Unfair Competition (2) .

LAW A 538 Estate Planning Workshop (3-4) .

LAW A 540 Land Use Planning (3) .

LAW A 541 Transnational Tax (5) .

LAW A 542 Land Law and the Urban Environment (3) .

LAW A 543 Business Reorganization Under the Bankruptcy Code (4) .

LAW A 545 International Environmental Law (4) .

LAW A 546 Patents ([2-4]-, max. 4) .

LAW A 547 Critical Perspectives in Law (3-). Involves close reading of texts in sociological and critical traditions of thinking about law, including work of such thinkers as Marx, Weber, Durkheim, Berger, Benjamin, Foucault, and Derrida; also work of thinkers who have written from a perspective informed by theories or experiences of politics, gender, race, and sexuality.

LAW A 548 Civil Rights ([2-6]-, max. 6) .

LAW A 549 Advanced Legal Research (4) .

LAW A 550 Constitutional Law ([2-8]-, max. 8) .

LAW A 551 Constitution and American Public Education (3-6) .

LAW A 552 Antitrust Law and Policy ([2-5]-, max. 5) .

LAW A 553 Sex, Gender, Sexuality: Law and Theory (4) Explores the intersections of law and sex, gender, and sexuality with the aid of various theoretical lenses, prominently feminist legal theory. Focuses on those areas of law where notions of sex, gender, and sexuality seem conflated and confused.

LAW A 554 Labor Relations and the Law ([1-5]-, max. 5) .

LAW A 556 Employment Discrimination ([2-4]-, max. 4) .

LAW A 557 Foreign Affairs and the Constitution (3) .

LAW A 558 Jurisprudence and Legal Philosophy ([2-4]-, max. 4) .

LAW A 560 Employment Issues (2/3) Examination of issues under selected employee protection laws. Analysis of the Fair Labor

Standards Act, Workers' Compensation, and Social Security Act (related to retirement, disability, and supplemental income benefits). Includes assessment of public assistance issues for low-wage workers. Prerequisite: LAW A 509, LAW A 562, or permission of instructor.

LAW A 561 Law and Economics (4) Offered: jointly with PB AF 519.

LAW A 562 Employment Law (3/4) .

LAW A 563 Urban Government (3) .

LAW A 564 Legal History (1-4, max. 4) .

LAW A 565 American Indian Law (4) .

LAW A 566 Theories of Justice ([2-4]-, max. 4) .

LAW A 574 International Law (2-4) .

LAW A 576 International Economic Relations and Comparative Trade Policy (3/4) .

LAW A 577 Immigration Law (4) .

LAW A 578 International Commercial Law ([1-4]-, max. 4) .

LAW A 579 Child Advocacy (4) .

LAW A 580 Family Law (4-5) .

LAW A 581 Washington Constitutional Law Seminar ([1-4]-, max. 4) .

LAW A 582 Bankruptcy (3) Introduction to business and consumer bankruptcy law based on the bankruptcy code and recent cases. Covers transactions and litigation aspects of bankruptcy law and practice. Considers the impact of bankruptcy law on areas covered in other courses such as business organizations, commercial transactions, environmental law, family law, torts, and intellectual property.

LAW A 583 Insurance Law (4) .

LAW A 584 American Public School Law (3) Constitutional, statutory, and common law principles common to all public education systems within the United States. Applicable law are a variety of substantive legal areas such as torts, property, contracts, administrative law, and fundamental rights. Offered: Sp.

LAW A 585 Admiralty (4) .

LAW A 586 Secured Transactions IV (4) .

LAW A 588 Trade Security and Copyright Protection of Intellectual Property in High Tech Industry (3) .

LAW A 590 Constitutional Law: Equal Protection, Fundamental Rights, and Due Process of Law (4/5) .

LAW A 591 Constitutional Law: Freedom of Expression (4/5) .

LAW A 592 Constitutional Law II: The Fourteenth and First Amendments — Equal Protection, Fundamental Rights, Due Process of Law, Freedom of Expression and Religion ([2-8]-, max. 8) .

LAW A 594 International Trademark and Copyright (3) Focuses on international treaties

as they relate to protection of trademarks and copyrights. Introduces international aspects of branches of intellectual property, including general principles of comparative and international law, and specific law related to obtaining and enforcing intellectual property rights in foreign countries. Prerequisite: either Law A 522 or Law E 588.

LAW A 598 Legal Research I (3) Introduction to legal bibliography and law librarianship. Basic primary and secondary legal bibliographic tools. Integration of manual and computer resources for effective legal research. Emphasis on state materials. Prerequisite: law librarianship major or LIS 503 and LIS 530 which may be taken concurrently. Offered: jointly with LIS 591.

LAW A 599 Legal Research II (3/4) Legal tools that answer more complex legal research problems, such as federal legislative histories, sources of administrative law, specialized subject research. Federal emphasis. Builds on skills and techniques taught in LIS 591/LAW A 598. Extensive work with online resources. Prerequisite: LIS 591 or permission of instructor. Offered: jointly with LIS 592.

Law B

LAW B 500 Civil Procedure II (3) .

LAW B 503 Evidence ([2-6]-, max. 6) .

LAW B 506 Conflicts of Laws ([2-6]-, max. 6) .

LAW B 507 Federal Courts and the Federal System (3/4) .

LAW B 510 Problems of Professional Responsibility (2-4, max. 4) .

LAW B 511 Seminar on Problems in International Environmental Law ([1-4]-, max. 4) .

LAW B 512 Legislation and the Formulation of Public Policy (3) .

LAW B 513 Evidence IV (4) .

LAW B 514 Street Law ([1-8]-, max. 8) .

LAW B 515 Criminal Procedure (5) .

LAW B 516 International Contracting ([2-4]-, max. 4) Credit/no credit only.

LAW B 517 Juvenile Justice Seminar ([1-6]-, max. 6) .

LAW B 519 Pre-Trial Practice (3) .

LAW B 520 Trial Advocacy ([2-6]-, max. 6) Credit/no credit only.

LAW B 521 Appellate Advocacy ([1-3]-, max. 3) Credit/no credit only.

LAW B 522 Mediation of Disputes (3) Credit/no credit only.

LAW B 523 Negotiation (2-4, max. 4) Credit/no credit only.

LAW B 525 Alternative Dispute Resolution (3) Overview of alternative dispute resolution including negotiation, mediation, arbitration, med-arb, early neutral evaluation, mini-trials, summary jury trials, and E-ADR. Critical evaluation of each process occurs through a combination of

assigned readings, roleplay exercises, videotapes, guest presentations, and student-designed classes.

LAW B 526 Mediation Clinic ([1-10]-, max. 10) Credit/no credit only.

LAW B 527 Criminal Law Clinic (8) Credit/no credit only.

LAW B 528 Unemployment Clinic ([2-8]-, max. 8) Credit/no credit only.

LAW B 529 Advanced Environmental Law and Practice (1-4, max. 4) .

LAW B 530 Judicial Externship (1-15, max. 15).

LAW B 531 Immigration Law Clinic ([1-8]-, max. 8) Credit/no credit only.

LAW B 532 Advanced Clinic (1-4, max. 4)
Advanced clinical training under the supervision of a law school faculty member in order to complete a project or case begun by the student during a clinic, or to pursue in more depth the subject of the clinic. Credit/no credit only
Prerequisite: Clinical basis for continued work.

LAW B 533 Interviewing and Counseling for Lawyers (2/3) Credit/no credit only.

LAW B 534 Affordable Housing Development Clinic ([1-12]-, max. 12) .

LAW B 535 Legislative Externship (1-15, max. 15) Credit/no credit only.

LAW B 536 Drafting Basic Business Documents (1-3, max. 3) .

LAW B 537 Refugee Advocacy Clinic ([1-12]-, max. 12) Credit/no credit only.

LAW B 538 Agency Externships (1-15, max. 15) Credit/no credit only.

LAW B 539 Public Interest Law Externship ([1-15]-, max. 15) Credit/no credit only.

LAW B 540 Japanese Law (4) Basic institutions and processes of the Japanese legal system. Historical development and traditional role of law, reception of Western law, and cultural and structural factors that influence the function of law and legal institutions. Offered: jointly with SISEA 540.

LAW B 541 Law in East Asia: China (4)
Introduction to the institutions and processes of the Chinese legal system. Focuses on the contemporary system and its role in relation to political, economic and social developments. Examines legal aspects governing foreign trade and investment in China. Offered: jointly with SISEA 543.

LAW B 542 Korean Law (3) *Taylor* Introduction to basic institutions and processes of the Korean legal systems. Emphasis on the historical development and traditional roles of law, the reception of Western law, and cultural and structural factors that influence the function of law and legal institutions.

LAW B 543 Intellectual Property Law in East Asia (3) .

LAW B 544 Transnational Litigation: United States-Japan ([2-4]-, max. 4) .

LAW B 545 Survey of American Law and Practice (6) Provides an integrated introduction to the U. S. legal system, legal analysis, legal research, and legal writing. Introduces tools and techniques for basic legal research in U. S. materials. Credit/no credit only.

LAW B 546 United States-Japanese Corporate Relations ([2-4]-, max. 4) .

LAW B 549 Government Regulation of Business in Japan (3) Offered: jointly with SISEA 549.

LAW B 550 Legal Analysis and Research for Students Not Trained in the Common-Law System ([1-4]-, max. 4) .

LAW B 551 Comparative Law Seminar ([2-6]-, max. 6) .

LAW B 552 Tutorial in Comparative Law ([1-4]-, max. 4) .

LAW B 553 Chinese Legal Tradition (3)
Offered: jointly with SISEA 553.

LAW B 555 Roman Law (3) .

LAW B 556 Islamic Law (3) Selected topics in Islamic law that highlight major aspects of Islamic civilization. Offered: jointly with NEAR E 524.

LAW B 557 Southeast Asian Law (2-4, max. 4)
Two or three countries in Southeast Asia are selected as case studies. Examines their legal and political histories; legal institutions and legal professions; commercial and investment laws; and compliance questions relating to labor standards, corruption, and human rights.

LAW B 558 Doctoral Thesis Seminar (2)
Students draft thesis abstracts, tables of contents, preliminary chapters, and presents arguments orally to identify core theories and applied studies to incorporate in their work. Read a selection of published work and indicative articles drawn from the list of relevant sources for individual thesis-in-development.

LAW B 559 Comparative Law: Europe, Latin America, and East Asia (4) .

LAW B 560 Criminal Justice Externship (1-15, max. 15) Credit/no credit only.

LAW B 561 International Law of the Sea (3)
Offered: jointly with SMA 506.

LAW B 562 Quantitative Methods (4) .

LAW B 563 Ocean Policy and Resources Seminar (3-) Study and research in selected legal problems relating to ocean and coastal law, marine trade and transportation, marine resources, and protection of the marine environment. Students prepare and present a research paper and critique papers prepared by other students. Prerequisite: LAW B 561, LAW B 565.

LAW B 565 U.S. Coastal and Ocean Law (4) *Allen* Study of the legal framework in the United States controlling allocation and use of coastal and marine resources. Topics include coastal zone management, fisheries management, protection of marine mammals and endangered species, marine pollution, offshore oil and gas development, and marine transportation. Offered: jointly with SMA 515.

LAW B 567 General Externship Perspectives Seminar (2) Credit/no credit only.

LAW B 573 Supreme Court Decision Making (2-4, max. 4) Examines Supreme Court decision making from both a theoretical and practical perspective. Surveys representative cases on the Court's current docket. Extensive preparation required of participants, who play the roles of lawyers, justices, and commentators. Emphasis on developing appellate advocacy skills.

LAW B 577 Law, Literature and Film ([2-4]-, max. 4) An examination of literary and cinematic portrayals of, and issues important to law, lawyers, and the legal system. Considers both portrayals purporting to depict the legal system as well as works envisioning lawyers and the legal system in a "better world."

LAW B 578 Seminar on Legal Problems of Economic Development ([1-6]-, max. 6) .

LAW B 580 Externship Tutorial (2) Credit/no credit only.

LAW B 581 Land, American Culture, and the Law: Perspectives on the Use and Ownership of the Natural Environment ([1-6]-, max. 6) .

LAW B 584 Indian Law Seminar ([2-6]-, max. 6) .

LAW B 589 Intellectual Property Law Seminar ([1-4]-, max. 4) .

LAW B 590 The United States Constitution: Past, Present, and Future (2) .

LAW B 593 Natural Resources Commons Property (3) A review of the different forms of natural resources and an exploration of the desirability of managing certain resources as commons or private property. Covers a review of the successes and failures by various groups in setting policy in this area.

LAW B 596 International Protection of Human Rights ([2-4]-, max. 6) *Stilt* .

LAW B 597 History of the Formation of the United States Constitution Seminar ([2-6]-, max. 6) .

LAW B 599 Special Topics (1-12, max. 12).

Law E

LAW E 500 Advanced Writing Project (1-3, max. 3) Independent research and writing project supervised by a faculty member. Projects are structured to develop skills in research, analysis, and writing. Offered: AWPSpS.

LAW E 502 White Collar Crime (4) .

LAW E 503 Analytic Writing (3) .

LAW E 504 Emerging Issues in Urban Government Seminar (6) Focuses on currently emerging issues in local government, such as municipal regulation of land use, the initiative process, technology and privacy, governmental responses to urban social problems and regional challenges. Production of publishable paper by student satisfies the advanced writing project requirement.

LAW E 505 Frontiers of Tort Law (3) .

LAW E 506 Asian Contract Law and Practice

(3) Examines how economic deregulation, financial restructuring and technological change affect contracts in Asia. Topics include licensing, franchise and e-commerce contract in Japan, China, and Taiwan; contract law and practice in Vietnam and Indonesia; cultural norms in contracting; convergence toward "global standards;" and the role of lawyers and other agents.

LAW E 507 Access to Justice Seminar (2)
Explores the legal, ethical, and financial issues involved in providing legal services to moderate income persons. Uses a combination of lectures and interactive discussion. Credit/no credit only.

LAW E 509 European Union Law (3) Survey of the legal origins of the European Union and the synthesis of the major European legal traditions achieved. Focus on the process of harmonizing national laws of the member states and economic integration in the area of competition law and free movement of goods and services.

LAW E 512 Law, Globalization, and Multinational Corporations (3) An interdisciplinary workshop that examines the role of multinational corporations in a global society. Topics include the legal construct of the multinational corporation, the multinational and the state, the multinational and human rights, and the multinational in the international arena. Offered: jointly with SIS 562.

LAW E 514 The Law of Nonprofit Organizations (2-4, max. 4) Examines laws generally applicable to nonprofit corporations and legal issue relating to cooperatives, credit unions, and thrift/mutual associations. Attention given to the Washington Nonprofit Corporations Act with comparable statutes and model legislation.

LAW E 515 Criminal Justice (3) .

LAW E 516 Advanced Criminal Procedure (5)
Covers the formal charging, trial, and appellate stages of criminal proceedings, including grand jury proceedings, prosecutorial discretion in charging, pretrial release and detention, charging and venue joinder and severance, double jeopardy assistance of counsel, discovery, and disclosure, criminal trials appeals, and collateral post conviction remedies. Prerequisite: LAW A 505; LAW B 515.

LAW E 517 Foreign Trade and Investment Law of the People's Republic of China (1-4, max. 4) Introduction to the regulatory regime governing foreign trade and investment in China and in-depth coverage of key aspects of the regime, with focus on issues faced by U.S. businesses. Covers specific regulations, their implementation in practice, as well as the political and economic background. Offered: jointly with SISEA 517.

LAW E 519 Philosophy of Law (4) Explores jurisprudence as "the jurist's quest for a systematic vision that will order and illuminate the realities of the law" and legal philosophy as "the philosopher's effort to understand the legal order and its role in human life." Examines various texts, emphasizing works of one or more proponents and critics of liberalism.

LAW E 521 Advanced Trial Advocacy (3) .

LAW E 522 Sexual Orientation, Gender Identity, and the Law Seminar (1-4, max. 4)
Nicolas Examines questions regarding sexual orientation and gender identity as they relate to

the areas of criminal, constitutional, employment, tort, and family law. Topics include equal protection, freedom of association, public and private employment discrimination, same-sex marriage and non-martial alternative to marriage, parenting, hate crimes legislation, sodomy laws, and the legal profession. Offered: S.

LAW E 523 Intellectual Property Law Clinic (3)
Clinical training in intellectual property law. Prerequisite: LAW A 526, LAW E 547, or LAW A 546. Offered: S.

LAW E 524 Child Advocacy Clinic ([4-12]-, max. 12) Credit/no credit only.

LAW E 525 Poverty Law (4) Overview of legal issues affecting poor people, including relevant background readings on poverty and access to justice, and selection problems such as housing and homelessness, education, employment issues of low-wage workers, income support and welfare reform, consumer law, family law, and child care.

LAW E 526 Law Reform in Transition Economies Seminar (2-, max. 6) *Clarke, Ramasastry, Taylor* Using interdisciplinary perspectives and case studies, this seminar probes the assumptions, methods and outcomes of commercial law reform in transition economies. Also highlights and critiques the role of international lawyers in this important, emerging area of practice.

LAW E 527 Automobile Impoundment Defense Clinic (3/4) Clinical training protecting rights of low-income people who stand to lose their vehicles under Seattle's Driving While License Suspended (DWLS) car impoundment law (akin to a forfeiture program) without having been convicted of DWLS. Counsel walk-up clients at Seattle Municipal Court, conduct legal research on possible challenges to vehicle seizure.

LAW E 528 Appellate Advocacy Clinic (2-, max. 4) Clinical training in appellate litigation with both seminar and practical components dealing with appellate procedure, strategy, and applicable substantive law. Students represent clients in state appellate court, writing at least one appellate brief and participating in oral argument.

LAW E 529 Tribal Court Criminal Defense Clinic (4-, max. 12) Offers clinical training in substantive areas of law implicated in representation of Native American defendants in tribal court criminal proceedings. Open to third year students in the JD program. Recommended: American Indian Law, Evidence, Criminal Procedure, Trial Advocacy. Offered: AWSp.

LAW E 531 Basic Income Tax Concepts (3)
Basic federal income tax principles, how the tax law impacts a wide variety of business and personal transactions and decisions, and what a reformed tax law might look like.

LAW E 532 Sports Law (3/4) Analyzes sports cases and materials that cover multiple disciplines, including contracts, torts, constitutional, antitrust, labor and employment, intellectual property, and criminal law. Participation in problem solving exercises and drafting and negotiations sessions, which explore areas like player and coaching contracts, investigation of NCAA rules infractions, and possible sanctions against universities.

LAW E 536 Practical and Professional

Responsibility Issues in the Small or Solo Law Practice (3-4, max. 4) Credit/no credit only.

LAW E 537 Refugee Law (2) Examines the processes in the United States for the admission of refugees and for the adjudication of asylum claims. Explores international refugee policy and evolving legal norms concerning asylum, temporary protection, repatriation, resettlement and internal displacement.

LAW E 538 International Civil Litigation in U.S. Courts (4) Examines the special procedural and substantive law governing both private as well as semi-public disputes in U.S. Courts and arising out of transnational transactions. Explores international arbitration and considers comparative aspects.

LAW E 539 Workshop on E.U., U.K. and U.S. Regulation of E-Commerce and Information Society (2/3) Compares the different attitudes to regulation of e-commerce and the information society in the U.S. and the European Union. Topics may include: an introduction to European Union institutions, regulatory, cultural themes in the Internet; e-society and e-commerce in Europe; regulation of illegal, harmful content, and Internet Service Provider liability, etc.

LAW E 540 Legal Issues of Internet Law (3)
Introduces the basic legal issues raised by networked digital technologies, such as the Internet. Covers jurisdiction, speech, privacy/access, propriety rights (copyrights, domain names), emerging law, leading policy debates, as well as fundamental Internet technical skills. Offered: S.

LAW E 541 Electronic Commerce and Information Technology (3) Introduction to legal and policy issues raised by electronic commerce and other emerging information technologies. Topics vary and may include intellectual property and contract issues raised by establishing an online commercial presence, rights and obligations of users of network services including constitutional rights, information privacy, electronic contracts, electronic payments, etc.

LAW E 543 Crime, Privacy, and Accountability on the Internet (2) An exploration of criminal activity on the Internet and issues that arise in investigating it. Examines the tension between privacy rights and the need for accountability. Includes substantive criminal statutes, constitutional rights and procedural laws that implement privacy and protections, and the practicalities of Internet crime investigations.

LAW E 544 Privacy Law (2) Examines the legal doctrines of privacy and confidentiality used to protect personal information. Aims to understand how courts and legislatures seek to protect information as new technologies and institutional practices emerge. Studies scope and implications of federal statutes that attempt to establish fair information practices with respect to electronic personal information.

LAW E 547 Legal Protection for Computer Software (3) .

LAW E 548 Litigation Strategies in Technology Protection (3) Deals with procedural and substantive legal issues in enforcement of patents. Proceeds through a litigation in the order that parties normally would. Substantive legal issues will be taught in conjunction with procedural and strategic considerations. Prerequisite: LAW A 546.

LAW E 550 Patent Prosecution (4) Addresses fundamentals of patent application drafting, through a combination of lectures and assignments. Addresses all aspects of proceedings before the U.S. Patent and Trademark Office, including preparing new applications, and examiner interviews. Recommended: engineering or science background. Prerequisite: LAW A 546.

LAW E 551 Representing Start-ups (4) Planning-oriented course uses the problem method to explore the corporate tax, and securities law, general business and financial considerations related to small business formation and financing. Prerequisite: LAW A 515; LAW A 530.

LAW E 552 Strategic Technology Licensing (3) Comprehensive coverage of issues related to exploitation of intellectual property rights as a business asset for new companies, or as a source of income for existing businesses.

LAW E 553 Technology Law and Public Policy (2) Survey of the domains of public policies that have been affected by the information revolution. Examines issues from Internet taxation, to personal data privacy, information warfare. Discusses the implications of the new public policies and whether it is feasible for states to enact different information policies.

LAW E 554 Technology Law and Public Policy Clinic ([2-4]-, max. 10) Clinical training in legislative and public policy advocacy under supervision of law school faculty. Examines legislative process, drafting, commentary and advocacy, appellate advocacy, and professional responsibility concerns. Supervised practice experience representing public interest with respect to law and technology. Credit/no credit only. Prerequisite: LAW E 553, which may be taken concurrently.

LAW E 555 Advising Privately-Owned Businesses (3) The role of lawyers as advisors to privately-owned businesses. Uses case studies to examine a broad range of structural planning issues, with emphasis on tax and business considerations, tax traps, and creative planning strategies. Analyzes, compares, and contrasts different business types. Prerequisite: LAW A 530.

LAW E 558 Law of Democracy: Voting Rights and Election Law (3) Examines the Law that governs the American system of democracy and considers the legality and desirability of competing models for structural reform. Considers various methods of voting and representation, the right to vote, and the Voting Rights Act.

LAW E 566 Innocence Project Northwest Clinic (3-4, max. 10) Offers students clinical training investigating and litigating claims of actual innocence on behalf of prisoners serving lengthy sentences for serious crimes. Open to second- and third-year students in the JD program.

LAW E 567 Survey of Intellectual Property (2-4, max. 4) *O'Connor* Intended for both law students who are only interested in a general overview of intellectual property and non-law students who are seeding a certificate in intellectual property law and policy. Designed as an alternative to Patents, Trademark and Unfair Competition Law, and Copyrights. Offered: W.

LAW E 568 Indian Law Clinic (4, max. 12) Supervised practice component on Indian law practice and procedure and advocacy skills. Provide legal advice, brief services and representation to low income Indian clients under the direct supervision of a practicing attorney. Client counseling research, negotiation, and community education. Offered: AWSp.

LAW E 569 Advanced Mediation Practicum (3) *Ewalt* Advanced clinical practicum in mediation under the supervision of the faculty and experienced mediators. Students convene and mediate cases referred to the Mediation Clinic from government agencies and other sources. Only for students who have successfully completed the Mediation Clinic LAW B 526, or have other comparable experience. Offered: A.

LAW E 575 Telecommunications Law and Policy (2) Survey basic policy principles underlying our nation's telecommunications laws. Focus on administrative and statutory law, paying special attention to the design and implementation of the Telecommunications Act of 1996. Addresses the role played by antitrust, economic regulation and constitutional law (particularly the First Amendment) in shaping our nation's telecommunications landscape.

LAW E 577 Drafting Technology Contracts (3) An advanced course in drafting and negotiating representative technology business agreements. Surveys such documents as a technology development agreement, a technology license agreement, an employee agreement, a web site development, a web commerce agreement, a source code agreement, and a technology evaluation agreement.

LAW E 579 International and Foreign Law Research (2) Overview of international law materials. Examine primary materials in the vernacular and in translations: constitutions, charters, codes, administrative rules, cases, treaties and other international agreements. Focuses on practice tools such as directories, guides, digests, and proceedings. Prerequisite: LAW A 506 or permission of instructor.

LAW E 582 Information Policy: Domestic and Global (5) National and international information policy: public and private sector policy in terms of privacy, access, and exploitation; technology infrastructures and policies supporting the information industries. Coverage includes freedom of information privacy, copyright, telecommunications, and emerging technologies.

LAW E 588 Trademark and Unfair Competition Law (3) *Hoffmann* Provides a comprehensive review of issues relating to protection of trademarks and other trade identity symbols under the common law and the Federal Lanham Act. Offered: A.

LAW E 589 IP Innovations in Science and Technology (2-, max. 6) *Takenaka* Covers controversial intellectual property law and policy questions arising from evolving science, technology and e-commerce, and addresses cutting edge issues from a multidisciplinary perspective. Examines the current legal regimes and research environment and explores innovative methods for maximizing the exploitation of advanced science and technology. Offered: AWSp.

LAW E 592 Federal Appellate Advocacy (1-6, max. 6) Representation of an otherwise pro se litigant in an appeal in the Ninth Circuit.

Preparation of the opening and reply brief and conduct the oral argument. Requires substantial research, multiple drafts, and painstaking familiarity with the record. Prerequisite: permission of the instructor. Credit/no credit only.

LAW E 593 Environmental Law Litigation and Practice (4-, max. 12) Survey of environmental litigation and practice regarding various environmental issues. Examines information-gathering (Freedom of Information Act), formal discovery, case selection, document control, and presentation in complex litigation, representation of groups, professional responsibility issues, working with scientists/presenting scientific evidence, and trial techniques. Prerequisite: LAW A 527, which may be taken concurrently.

LAW E 594 Environmental Law Clinic (4-, max. 12) Examines applicable environmental law and procedure, skills training, and professional responsibility concerns. Participation in a carefully supervised practice experience representing clients in cases involving environmental issues. Students must be Rule 9 qualified. Credit/no credit only. Prerequisite: LAW A 527; LAW E 593, which may be taken concurrently.

Health Law

LAW H 501 Fundamentals of Health Law (4) .

LAW H 502 Medical Malpractice (3/4) .

LAW H 503 Medical Ethics and Jurisprudence (3-) .

LAW H 504 Legal, Ethical, and Social Issues in Public Health Genetics (3) *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with PHG 512/MHE 514.

LAW H 507 Law, Medicine, and Ethics in the Context of Pain Management (2) Reviews the problem of physicians failing to relieve pain of the patients in the dying process and the legal and ethical issues they face as well as the cultural sources of the problem.

LAW H 508 Beginning of Life: Rights and Choices (2) Addresses the controversial legal issues engendered by our increasing control over the beginning of life. Focuses on the law, regulation, and policy implications of contraception; new reproductive and genetic technologies, including surrogate parenthood, sperm and egg donation, in-vitro fertilization, and other methods of conquering infertility; and abortion.

LAW H 510 Topics in Law and Medicine ([1-4]-, max. 4) .

LAW H 520 Genetics and the Law (2) *Kuszler* Considers the legal issues arising from new genetic technologies and information. Statutes, regulations, and cases used to demonstrate the constitutional, contract, and tort law complications resulting from dissemination of these technological advances. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with PHG 523.

LAW H 524 Forensic Evidence (3) Examines the application of the rules of evidence in cases that involve forensic evidence. Examines paradigmatic cases involving homicide and

physical or sexual assault, although the principles examined are applicable generally in civil and criminal cases.

LAW H 525 Criminal Law and Procedure (3) Provides an understanding of U.S. criminal law and criminal procedure. Explores basic principles of liability, defenses, and basic constitutional principles governing interactions between police and suspects. Open to forensic nursing students and graduate law students, but not JD students.

LAW H 530 Disability Law (3) Considers the definition of disability as defined by statute (ADA, FRA), case law, and social perception. Focuses on education law and entitlements, assess to and discrimination in employment, housing, public transportation, and health care.

LAW H 531 Disability Clinic (4-, max. 12) Clinical training in disability law issues, including access to Medicaid and other public benefits, assistive technology issues, transit accessibility, and low-wage worker accommodation issues, among other possible issues. Students represent clients at Columbia Legal Services under supervision of CLS attorneys. Prerequisite: LAW A 567.

LAW H 534 Mental Health and the Law (3) Covers medical and legal definitional issues as well as major civil and criminal law issues, including standards and procedures for involuntary commitment; consent for, and informed refusal of, treatment; de-institutionalization/community-based treatment; the insanity defense; competency to stand trial; and punishment of the mentally ill convict.

LAW H 536 Research Ethics and Regulation (3) *Mastroianni* Explores the ethical principles and concepts and U.S. laws related to (1) research conducted with animals, (2) research on humans, and (3) the responsible conduct of research Required for graduate students in the Department of Medical History and Ethics, School of Medicine. Offered: jointly with MHE 536. W.

LAW H 540 Health and Human Rights (3) Examines the basic concepts in the fields of human rights law and public health, and uses those concepts to examine the interdependence and tensions between the two fields. Introduction to the fields of public health and human rights law, examining the impact of health policies and programs on human rights.

LAW H 570 Biotechnology and the Law (3) .

LAW H 580 Advanced Health Law (3) Considers the impact of antitrust law, fraud, and abuse prohibitions, the corporate practice of medicine doctrine, tax law and other state and federal laws upon emerging health care entities. Focuses on integrated health care delivery systems. Prerequisite: LAW A 597.

Intellectual Property Law

LAW P 501 Intellectual Property Law Core (8) Intensive study of intellectual property law core subjects: patents, copyrights, trade secrets, and trademarks. Examines fundamental principles their underlying policies, and how the laws inter-relate. Open to J.D students with permission of instructor. Not open to students who have taken LAW A 522, Law A 546, or Law E 588.

LAW P 504 Economic Analysis of Intellectual Property (2-3) Explores the intersection between

intellectual property law and economics from both a macro and micro economic perspective; economic justification of intellectual property law; and portfolio management tools that can evaluate intellectual property protection as an investment. Prerequisite: either LAW P 501 or LAW E 567. Recommended: economics. Offered: W.

LAW P 509 Intellectual Property and Unfair Competition (2-3) *Bangasser* Examines in-depth application of competition law and policy to the creation and exploration of the Intellectual property. Offered: Sp.

LAW P 528 LL.M. Intellectual Property Law Practicum (1-4, max. 6) Experience with an approved non-profit organization, judicial or legislative body, or governmental agency on issues related to intellectual property law and policy. Students work under the guidance of experienced practitioners; both student and field supervisor provide the supervising law faculty member with a final written evaluation. Credit/no credit only.

LAW P 545 Advanced Patent Law Seminar (3) *Taylor* Study of public policy and practice considerations relating to patenting research results in high technology. Examines the most up-to-date issues in legal protection of technology from the comparative law perspective. Students write and present a research paper on a topic related to patent law and policy. Prerequisite: LAW A 546. Offered: W.

LAW P 590 Graduate Intellectual Property Law Tutorial (1-4, max. 4) Focuses on a specialized area of intellectual property law. Limited to students in the Graduate Program in Intellectual Property Law and Policy. Tutorial must be approved by the program director.

Taxation Law

LAW T 502 Federal Tax Controversies and Procedures (3) .

LAW T 503 Problems of Timing (2-3, max. 3) .

LAW T 504 Property Dispositions and Transactions (3) .

LAW T 505 Introduction to Income Taxation (2) Addresses a number of fundamental income tax concepts, including the computation of individual tax liability, statutory exclusions, deductions, and gains. Also deals with issues related to character and timing.

LAW T 506 Tax Practice and Skills (1) Orientation to core concepts of tax practice, including administrative structure and nature of tax law, nuances of statutory interpretation, and the relative authority of statutory, administrative, and judicial sources. Includes overview of print and online tools for federal tax research.

LAW T 507 Federal Tax Policy Seminar (2-, max. 4) Examines the theoretical and policy considerations applied in assessing existing and proposed federal tax regimes. Topics include: the nature of the income tax as a tax on saving and consumption; consumption taxes as alternatives to taxes on income; tax policy and charitable giving; taxes and the poor; and more.

LAW T 510 Estate and Gift Taxation (3) .

LAW T 511 Taxation of Partners and Partnerships ([1-4]-, max. 4) .

LAW T 512 Exempt Organizations ([2-4]-, max. 4) .

LAW T 513 Estate Planning (3) .

LAW T 515 International Taxation I (3) .

LAW T 516 International Taxation II (3) .

LAW T 517 Estate and Gift Taxation II (2) .

LAW T 518 Taxation of S Corporations (2) .

LAW T 519 Canadian-United States Tax Issues (2) *Ko* Overview to various cross-border issues, including the Canadian income tax (and its GST tax), residency for Canadian tax purposes, principles relating to operation of Canadian business in the United States and profit repatriation and U.S. investment in Canada and similar repatriation issues.

LAW T 520 Tax Ethics (2) Considers the role of ethics in tax practice and its application to specific problems faced by tax professionals. Explores substantive rules governing tax. Addresses ethical problems of tax professionals in connection with structuring transactions, resolving tax controversies with and presenting cases to the IRS, and representing litigants in tax controversies.

LAW T 521 Compensation and Benefits I (3) .

LAW T 522 Compensation and Benefits II (2) .

LAW T 523 International Estate Planning (2) .

LAW T 524 Transfer Pricing Seminar (2) *Andrade* Reviews section 482 of U.S. Internal Revenue Code and the Treasury regulations thereunder with a focus on multinational corporations (MNCs) and their related party transactions that are subject to the arm's length standard. Application of U.S. transfer pricing regulations to related party transactions involving MNCs.

LAW T 525 Advising Privately-Owned Businesses (3) Explores the role of the lawyer as an advisor through case studies examining a range of structural planning issues and the practical and analytical challenges of the planning process. Emphasizes tax and business considerations, and creative planning strategies. Prerequisite: LAW A 530; LAW A 515, which may be taken concurrently.

LAW T 526 Low-Income Tax Payer Clinic (2/3-, max. 9) Clinical training in federal tax litigation under the supervision of members of the law school faculty.

LAW T 528 Graduate Tax Practicum (2) Field-based experience in a department-approved public or private entity, of eight hours per week minimum under the guidance of experienced practitioners. The student and practitioner produce a final report summarizing the practicum experience to the supervising faculty member, who decides whether to award academic credit. Credit/no credit only.

LAW T 530 Corporate Reorganizations and Acquisitions (3) Examines the federal income taxation of business entities and their owners. Limited to coverage of the fundamental concepts of corporate and partnership taxation.

LAW T 531 Advanced Corporate Tax Problems (2) Examination (through case studies) of

consolidated tax returns, limits on the use of tax benefits, carryover of tax attributes, classifications of debt versus equity, and corporate penalty taxes.

LAW T 532 Taxation of Estates, Trusts, and Beneficiaries (2-3, max. 3) .

LAW T 533 Tax Crimes: Investigations, Prosecutions, and Penalties (2) *Chiconie*
Focuses on elements of tax and related crimes with a view of the governmental investigative tools and powers, including IRS summonses, search warrants, and Grand Jury investigations. Covers taxpayer's rights and defenses in a criminal case; the IRS voluntary disclosure program; and the elements of civil penalties. Offered: AWP.

LAW T 534 State and Local Taxation (4) .

LAW T 536 Taxation of Trans-Pacific Transactions (2/3) .

LAW T 537 Business Planning ([2-6]-, max. 6) .

LAW T 538 Estate Planning for Business Interests (2-3) Business succession and estate planning issues for the owners of closely held business, including shareholder agreements, recapitalizations, family limited partnerships and limited liability companies, taxable acquisitions, split dollar agreements, redemptions to pay death taxes, electing small business trusts and more. Prerequisite: LAW T 510.

LAW T 539 Matrimonial Tax (2) Covers tax aspects of married relationships and the tax impact of the dissolution of a marriage. Includes joint returns, the marriage tax penalty, innocent spouse relief from joint return liability, pre-nuptial agreements, transfer tax effects of inter-spousal transfers, alimony, child support, and marital property transfers incident to divorce.

LAW T 541 Limited Liability Companies (2) .

LAW T 543 Advanced Partnership Tax (2)
Builds on the material covered in the basic course, Taxation of Partners and Partnership. It covers more sophisticated aspects of partnership allocations; transactions between partners and partnerships; and sale or exchange of partnership interests. Prerequisite: LAW T 511.

LAW T 544 Tax Aspects of Charitable Giving (2) Examines income, gift and estate tax consequences of charitable gifts of cash and property. Includes: theoretical and policy bases of charitable deduction; technical requirements; effect of receipt of benefits; percentage limitations based on donee and type of property; application of carryover rules; effect of partial cash or cash equivalent consideration.

LAW T 545 International Taxation of Intellectual Property (2) *Smith* Overview of the tax consequences of various types of common commercial arrangements that involve the

development, ownership, and use of intangible property within multinational groups. Explores tax efficient arrangements such as contract research and licensing arrangement, cost-sharing arrangement, and the use of intangible holding companies.

LAW T 546 Taxation of Real Estate Interests (2) An in-depth study and analysis of the tax consequences of acquiring, developing, operating, and disposing of interests in real property. Focuses on practical approaches to structuring sale-leaseback transactions, syndications, installment sales, and like-kind exchanges. Considers the application of the passive activity loss rules in real estate.

LAW T 547 International Taxation of Electronic Commerce (2-, max. 4) Electronic commerce is defined as the exchange of digital information in connection with the purchases and sale of goods and services. Seminar and discussion format. Explores the potential methods and approaches for the taxation of earnings associated with electronic commerce..

LAW T 548 Tax Writing (2) Designed to improve writing skills as they relate to practice of tax law. Students draft many types of tax documents. Also considers professional responsibility aspects of tax practice. Recommended: LAW T 506.

School of Medicine

Anesthesiology

ANEST 498 Undergraduate Thesis (*) *Sivarajan*
By special arrangement. Time and credit to be arranged. Offered: AWP.

ANEST 499 Undergraduate Research (*) *Sivarajan*
Specific research problems relating to pulmonary, cardiovascular, renal, obstetric, and central nervous system functions, and their alteration by anesthetic techniques and agents. (Six weeks, full-time. Limit: two students.) Offered: AWP.

ANEST 501 P-Preceptorship in Anesthesiology (1) *Sivarajan* An opportunity for first- and second-year medical students to gain experience with medical practice situations by observing clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: AWP.

ANEST 680 P-Basic Anesthesia Clerkship (4) *Sivarajan* Introduction to the principles of airway management, ventilatory support, use of local anesthetics, techniques of patient monitoring and fluid therapy. Skills taught include airway management, venipuncture, lumbar puncture and endotracheal intubation. Prerequisite: third- or fourth-year student. (Two weeks, full-time. Limit: three to five students each two-week period.) Affiliated hospitals. Offered: AWP.

ANEST 681 P-Advanced Clerkship in Anesthesiology (8) *Sivarajan* Clerkship for students desiring greater exposure to anesthesiology as a specialty. Individual programs can be arranged in the following areas: surgical anesthesia, obstetrical anesthesia, and pain clinic. Prerequisite: Third- or fourth-year student. (Four weeks, full-time. Limit: two students per period.) Affiliated hospitals. Offered: AWP.

ANEST 697 P-Anesthesiology Special Electives (*, max. 24) *Sivarajan* Special clerkships, externships, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain a special assignment form from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor. (Four to twelve weeks, full-time.) Offered: AWP.

ANEST 699 P-WWAMI Anesthesiology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Biochemistry

BIOC 396 Research in Chemistry and the Chemical Sciences (1) NW Presentations by researchers in academia and industry describing the opportunities for research chemistry and biochemistry. Credit does not count toward chemistry major requirements. Credit/no credit only. Prerequisite: CHEM 337. Offered: jointly with CHEM 396; A.

BIOC 405 Introduction to Biochemistry (3) NW *Daum, Teller, Wiseman* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: either BIOL 200, BIOL 201, or both

BIOL 101 and GENET 371; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

BIOC 406 Introduction to Biochemistry (3) NW *Hurley, Petra* Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical events in living systems in terms of metabolism and structure-function relationships of biologically important molecules. Suitable for pre-majors, for students interested in careers in medicine, dentistry, pharmacy, medical technology. Prerequisite: BIOC 405. Offered: W.

BIOC 426 Basic Techniques in Biochemistry (4) NW *Chung, Petra* Introduction to basic biochemistry experiments. Acquaints students (largely Biochemistry majors) with basic biochemical laboratory techniques. Prerequisite: BIOC 440, which may be taken concurrently. Offered: ASP.

BIOC 440 Biochemistry (4) NW *Davis, Klevit* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: 2.5 in either BIOL 201 or BIOL 200; 2.5 in either CHEM 224, CHEM 239, or CHEM 337; 2.0 in either MATH 124 or MATH 134. Offered: A.

BIOC 441 Biochemistry (4) NW *Young* Biochemistry and molecular biology (with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: 2.0 in BIOC 440. Offered: W.

BIOC 442 Biochemistry (4) NW *Kimelman, Palmiter* Biochemistry and molecular biology

(with quiz sections) for undergraduate students in molecular and cellular biology, for biochemistry majors, and graduate students in other science departments. Prerequisite: either 1.7 in BIOC 406 or 2.0 in BIOC 441. Offered: Sp.

BIOC 496 Research Seminar for Undergraduates (1, max. 2) NW formal presentations of student research. One credit applies to research component of a relevant major. Credit/no credit only. Offered: jointly with CHEM 496; Sp.

BIOC 498 Undergraduate Thesis (*) For senior medical students. Offered: AWSpS.

BIOC 499 Undergraduate Research (*) Investigative work on enzymes, proteins, lipids, molecular biology, developmental biology, intermediary metabolism, physical biochemistry, and related fields. Credit/no credit only. Offered: AWSpS.

BIOC 515-519 (For description, see listing for "Current Literature Conferences" at the end of this section.).

BIOC 520 Seminar (1) Seminar dealing with timely topics in the field of biochemistry. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 525-529 (For description, see listing for "Current Literature Conferences" at the end of this section.).

BIOC 530 Advanced Biochemistry (3) Baker, Gelb, Hol, Klevit, Stenkamp, Stoddard Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisite: a comprehensive course in biochemistry and permission. Offered: A.

BIOC 533 Topics In Biochemistry (1, max. 30) Daum, Davie, Fischer Provides in-depth examination of current topics in biochemistry, molecular biology, and structural biology. Designed to help participants in basic science departments become acquainted with latest ideas on selected topics. Emphasis on analysis of key concepts in the field with reference to classical papers and recent literature. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 534 Topics In Molecular Biophysics (1.5) Parson Emphasis on methods used to study macromolecular structure and dynamics, including x-ray crystallography, NMR, optical spectroscopy, computer modeling, protein folding and ligand binding. Two topics covered each quarter; students may register for one or both. Prerequisite: permission of instructor. Offered: AWSp.

BIOC 535-539 (For description, see listing for "Current Literature Conferences" at the end of this section.).

BIOC 540 Literature Review (2) Parson Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: jointly with BMSD 540 A.

BIOC 541 Literature Review (2) Palmiter Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: W.

BIOC 542 Literature Review (2) Morris

Emphasizes critical evaluation of original articles in the literature. For first-year graduate students in biochemistry and students of other science departments, with permission. Offered: Sp.

BIOC 546-548 (For description, see listing for "Current Literature Conferences" at the end of this section.).

BIOC 555-559 (For description, see listing for "Current Research Conferences" at the end of this section.).

BIOC 565-569 (For description, see listing for "Current Research Conferences" at the end of this section.).

BIOC 575-579 (For description, see listing for "Current Research Conferences" at the end of this section.).

BIOC 581 Introduction to Biochemical Research (4, max. 16) Student works with one of the research groups within the department for one quarter and then rotates to other laboratories for second and third quarters. Credit/no credit only. Prerequisite: graduate standing in biochemistry or permission of instructor. Offered: AWSpS.

BIOC 586-588 (For description, see listing for "Current Research Conferences" at the end of this section.).

BIOC 600 Independent Study or Research (*) Offered: AWSpS.

BIOC 700 Master's Thesis (*) Offered: AWSpS.

BIOC 800 Doctoral Dissertation (*) Offered: AWSpS.

Current Literature Conferences

BIOC 515- 519, 525- 529, 535- 539, 546- 548 Current Literature Conference in Biochemistry Weekly literature reviews of topics pertinent to ongoing research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.).

BIOC 515 Matrix Macromolecules in Morphogenesis and Development (1, max. 30) Bornstein Offered: AWSp.

BIOC 516 Molecular Mechanisms of Blood Clotting (1, max. 30) Davie Offered: AWSp.

BIOC 517 Protein Structure (1, max. 30) Baker Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 518 Signaling in Development (1, max. 30) Ruohola-Baker Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 525 Phytoremediation (1, max. 4) Literature survey of phytoremediation topics. Discussion of latest techniques for the use of plants to concentrate heavy metals in the soil and of plants and plant-bacteria combinations to detoxify various organic contaminants. Credit/no credit only. Offered: AWSpS.

BIOC 526 Control of Growth and Differentiation During Development (1, max. 30) Hauschka Credit/no credit only. Offered: AWSpS.

BIOC 528 Signal Transduction (1, max. 30) Hurley Credit/no credit only. Offered: AWSp.

BIOC 529 Molecular Biology of Early Development (1, max. 30) Kimelman Offered: AWSpS.

BIOC 535 Macromolecular Structure (1, max. 30) Klevit Offered: AWSp.

BIOC 536 Control of Cell Growth (1, max. 30) Morris Offered: AWSp.

BIOC 537 Regulation of Gene Expression (1, max. 30) Palmiter Offered: AWSpS.

Current Research Conferences

BIOC 555- 559, 565-569, 575-579, 586- 588 Current Research Conferences in Biochemistry Weekly group conferences concerning ongoing graduate student and postdoctoral research in biochemistry. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. (Only 25 credits may be counted toward degree.).

BIOC 555 Cell and Molecular Biology of Connective Tissue Proteins (1, max. 30) Bornstein Offered: AWSpS.

BIOC 556 Enzymatic and Genetic Aspects of Blood Clotting (1, max. 30) Davie Offered: AWSp.

BIOC 557 Growth Regulation by Calcium Binding Proteins (1, max. 30) Davis Offered: AWSpS.

BIOC 559 Membrane Biochemistry and Cell Growth (1, max. 30) Glomset Offered: AWSpS.

BIOC 560 Protein Folding (1, max. 30) Baker Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 561 Origin of Polarity (1, max. 30) Ruohola-Baker Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

BIOC 565 Plant Molecular Genetics (1, max. 30) Offered: AWSpS.

BIOC 566 Growth and Differentiation of Skeletal and Cardiac Muscle (1, max. 30) Hauschka Offered: AWSpS.

BIOC 568 Molecular and Genetic Aspects of Protein Signal Transduction (1, max. 30) Hurley Offered: AWSpS.

BIOC 569 Inductive Events in Early Development (1, max. 30) Kimelman Offered: AWSpS.

BIOC 575 NMR Analysis of Proteins and Nucleic Acids (1, max. 30) Klevit Offered: AWSp.

BIOC 576 Sequential Analysis of Growth Regulation (1, max. 30) Morris Offered: AWSpS.

BIOC 577 Gene Regulation in Transgenic Mice (1, max. 30) Palmiter Offered: AWSpS.

BIOC 578 Electron Transport in Photosynthesis (1, max. 30) Parson Offered: AWSp.

BIOC 588 Molecular Biology of Yeast Gene Regulation (1, max. 30) Young Offered: AWSpS.

Biological Structure

B STR 301 General Anatomy (4) NW *Pittack* Survey of systemic human anatomy, including human skeletal system, muscular system, respiratory system, circulatory system, nervous system, digestive system, endocrine system, urinary system, and reproductive system. For second-, third-, and fourth-year undergraduates. Offered: Sp.

CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4) See Conjoint Courses.

B STR 431 Introduction to Neuroanatomy (4) NW *Broderson, Mulligan, Westrum* Survey of the anatomy and functional organization of the human central nervous system, with clinical applications. Prerequisite: admission to the School of Dentistry. Offered: W.

CONJ 480 Neuroscience and Rehabilitation Professionals (5) See Conjoint Courses.

B STR 498 Undergraduate Thesis (*) Individual research projects under the supervision of an instructor. For senior medical students. Offered: AWSpS.

B STR 499 Undergraduate Research (*) Individual research projects in cellular and developmental biology, experimental immunology, reproductive biology, neurobiology, molecular structure, morphometrics, computer modeling, and related fields under the supervision of an instructor. Offered: AWSpS.

B STR 502 Gross Anatomy (1-5, max. 5) *Graney* Lecture and laboratory dissection course in regional anatomy: upper and lower extremities. Prerequisite: permission of instructor. Offered: W.

B STR 503 Gross Anatomy (1-5, max. 5) *Graney* Lecture and laboratory dissection course in regional human anatomy; head and neck. Prerequisite: permission of instructor. Offered: Sp.

B STR 510 Seminar in Anatomy (1) *Graney* Scientific and historical basis of selected studies in biological structure, anatomy, and human development. Original literature used as basis for textbook descriptions is reviewed. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

B STR 512 Human Microanatomy (4) Lectures and laboratory treating the specialized tissues and organs of the body from the microscopic and ultramicroscopic points of view. Prerequisite: permission of instructor. Offered: A.

B STR 515 Biological X-Ray Structure Analysis (3) *Stenkamp* Theory of x-ray diffraction, with emphasis on applications to biological systems. Prerequisite: permission of instructor. Offered: W.

B STR 517 Embryology/Developmental Biology Seminar (1) *Farr* Embryology of a region or organ. Topics vary. Emphasis on original literature and developmental principles. Prerequisite: permission of instructor. Offered: AWSp.

B STR 519 Current Problems in Macromolecular Structure (2, max. 10) *Hol* A discussion of macromolecular structures related to specific areas of biological research. Emphasis on discussion of relevant research papers and use

of computer graphics to visualize the molecular structures. Offered: AWSpS.

CONJ 520 Anatomy and Autopsy (1/2, max. 2) *Fligner* See Conjoint Courses.

B STR 520 Structure Based Design of Drugs (3) *Hol, Verlinde* Lecture and discussion on research papers illustrating protein structure based design of new drugs. Review of methods and extensive discussion of all known mechanisms of drug resistance. Offered: even years; W.

B STR 521 Advanced Biomacromolecular Crystallography (3) *Hol, Merritt, Stenkamp* Aspects of protein crystallography ranging from crystal growth, phase determination methods, density averaging to refinement, fiber diffraction of DNA and proteins. Offered: odd years; Sp.

CONJ 524 Structural Basis of Neural Transduction (1.5) See Conjoint Courses.

UCONJ 524 Developmental Neurobiology (3) *Raible, Reh, Roelink, Rubel* See University Conjoint Courses.

B STR 530 P-Gross Anatomy and Embryology for Dental Students (8/13, max. 13) *Broderson, Clark* Normal anatomy of the thorax, abdomen, pelvis, and perineum are discussed and dissected employing cadavers. The development of the organ systems is presented and related to definitive adult structure. Developmental anomalies and diagnostic anatomy are also discussed. Prerequisite: admission to School of Dentistry. Offered: A.

B STR 531 Human Embryology and Developmental Biology (2) Classical embryology, embryonic induction, gastrulation, neural induction and patterning, organ formation, limb induction and patterning, development of head and neck. Comparative development and evolution and the implications of conserved signaling mechanism. Critical signaling pathways and their role in development.

B STR 540 Special Problems in Anatomy (1-6, max. 6) Special projects in anatomy under sponsorship of faculty member. Prerequisite: graduate, medical, or dental student standing and permission of instructor. Offered: AWSpS.

B STR 541 P-Microscopic Anatomy for Dental Students (4) Lecture and laboratory work in microscopic anatomy. For dental students taking HUBIO 510; others by permission of instructor. Offered: A.

CONJ 542 Development (1.5) See Conjoint Courses.

CONJ 545 Molecular Interactions and Medicine (1.5) See Conjoint Courses.

B STR 550 P-Head and Neck Anatomy for Dental Students (4) *Broderson, Clark, Graney* Normal anatomy of the head is discussed and dissected, employing human cadavers. The fundamentals of diagnostic anatomy are also discussed. Restricted to first-year dental students. Prerequisite: B STR 530. Offered: Sp.

B STR 555 Laboratory Rotation in Biological Structure (*, max. 5) Introduction to experimental design, research methods, and scientific thought in laboratories of faculty members. Provides hands-on experience, an entrance into the literature of the field, and opportunities for

discussion with all members of the laboratory. First-year dental students only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 556 Topics in Developmental and Systemic Cell Biology (1-3, max. 3) Recent advances in molecular and developmental aspects of cell biology. Emphasis on specific organ systems. Differentiation of lymphocytes, germ cells, muscle, epidermis; cell biology of lens, vessel wall, visual cortex; computer modeling; cell-cell and cell-matrix interactions. Prerequisite: undergraduate biochemistry and/or molecular biology and general cell biology or permission of instructor. Offered: AWSpS.

B STR 557 Biomolecular Structure Seminar (1) *Hol* Literature review of key research in Biomolecular Structure in the form of short presentations by participants followed by discussion. Critical evaluation of methods and results regarding properties and protein structure determination. Credit/no credit only. Prerequisite: graduate standing in biological structure or biochemistry and permission of instructor. Offered: AWSp.

B STR 559 Developing Research Proposals (2) Developing research proposals in cellular, molecular, and developmental biology; neurobiology; morphometrics and computer modeling; experimental immunology and hemopoiesis; reproductive biology; molecular structure. Weekly seminars by faculty and written proposals by students to include background and significance of projects' specific hypotheses and aims, methodology, analyses of possible outcomes. Prerequisite: permission of instructor. Offered: even years; Sp.

B STR 580 P-Anatomy Teaching Practicum (*, max. 8) *Dacey, Graney, Mulligan* Opportunity for medical student (or other professional student) to gain teaching experience in biological structure and human biology courses, including gross anatomy, histology, and neuroanatomy. May include lecture, laboratory, conference, depending on student interest, experience. Credit based on course credit in which student is assisting. Prerequisite: permission of course chairperson. Offered: AWSp.

B STR 584 Seminar in Neurogenesis (1) *Reh* Discussion of current research on process by which neurons are generated in the nervous system. Offered: AWSpS.

CONJ 585 Surgical Anatomy (1-3, max. 12) *Graney* See Conjoint Courses.

B STR 591 X-Ray and NMR Analysis of Macromolecular Structure (1, max. 9) *Hol* Weekly discussion of current topics in research on molecular structure, usually emphasizing techniques of x-ray crystallography. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 595 Skin Biology Seminar (1, max. 5) *Smith* Presentation, discussion of ongoing multidisciplinary research in basic and clinical problems of adult and fetal skin biology. Genetic diseases of epidermis and dermis, percutaneous absorption in adult and fetal skin, wound healing, cutaneous blood flow, development and prenatal diagnosis of inherited disorders, pigment cell biology. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 597 Topics in Neurobiology (1, max. 5) *Harris* Presentations by participants of topics in

neuroanatomy, neurophysiology, neurochemistry, and other areas relating to the nervous system. Problems of current research interest. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

B STR 598 Reading in Biological Structure (2) Critical evaluation of research in biological structure, including current problems, methods and future directions by reading and discussing research and review papers. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

B STR 600 Independent Study or Research (*) Offered: AWSpS.

B STR 700 Master's Thesis (*) Offered: AWSpS.

B STR 800 Doctoral Dissertation (*) Offered: AWSpS.

Comparative Medicine

C MED 407 Principles of Animal Experimentation: The Mouse (3) *Brabb, Grossmann, Treuting* Focus on biology and care of mice used in medical research, and the experimental design and ethics of animal research. Includes lectures and problem-based learning. For graduate and advanced undergraduate students. Prerequisite: permission of instructor. Offered: AWSpS.

C MED 499 Undergraduate Laboratory Research (1-6, max. 6) *Ladiges, Price* Specific problems in comparative medicine. Credit/no credit only. Offered: AWSpS.

C MED 512 Introduction to the Anatomical Analysis of Animal Disease (2) *Brabb, Iritani, Treuting* Use of animals in experimental study of disease; techniques of animal necropsy, characterization, interpretation of gross and microscopic lesions, correlation of lesions with altered physiological processes, differentiation between naturally occurring and experimentally induced lesions. Prerequisite: PATH 444, PATH 445, or equivalent, and permission of instructor. Enrollment limited: two students per quarter. Offered: AWSpS.

C MED 514 Comparative Pathology Conference (1, max. 6) *Liggitt, Treuting* Focus on histopathology of naturally occurring and experimentally induced lesions of primates, laboratory and domestic animals, fish, wildlife, and birds. Participants discuss the lesions and the basic pathogenetic mechanisms that underlie them. Prerequisite: PATH 500 or equivalent and permission of instructor. Credit/no credit only. Offered: AWSpS.

C MED 516 Current Literature in Laboratory Animal Medicine (1, max. 12) *Liggitt* Critical evaluation of recent articles on laboratory animal medicine and science. Emphasis on literature dealing with spontaneous diseases of laboratory animals, biology and husbandry, zoonotic diseases, and animal models of human disease. Experimental design, use of animals in research, and methods of reviewing manuscripts. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

C MED 518 Clinical Conference Seminar (1, max. 12) *Price* Clinical reports of cases of spontaneous and induced diseases, animal models of human disease, and zoonotic diseases discussed. Disease prevalence and preventive

medicine measures. Diagnostic exercises. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

C MED 520 Biology of Laboratory Animals (1) *Brabb, Iritani, Treuting* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and differences within, and between, species, including man. Husbandry, genetics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: A.

C MED 521 Biology of Laboratory Animals (1) *Brabb, Iritani, Treuting* Fundamentals of the morphological, functional, and applied aspects of anatomy, physiology, pharmacology, biochemistry, and immunology of the commonly used laboratory animal species. Similarities and differences within, and between, species, including man. Husbandry, genetics, behavior, and nutrition. Prerequisite: permission of instructor. Offered: W.

C MED 526 Epidemiology of Diseases Communicable from Nature (3) *DiGiacomo, Rausch, Weigler* Explores the public health aspects of zoonotic diseases, their epidemiology and approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans. Prerequisite: C MED 511, C MED 512, or C MED 520 or permission of instructor. Offered: jointly with EPI 526; Sp.

C MED 530 Diseases of Laboratory Animals (1) *Brabb, Iritani, Treuting* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: A.

C MED 531 Diseases of Laboratory Animals (1) *Brabb, Iritani, Treuting* Analysis of etiology, pathogenesis, pathology, and disease processes in rodents, lagomorphs, carnivores, and nonhuman primates. Prerequisite: permission of instructor. Offered: W.

C MED 540 Animal Models (1) *Brabb, Iritani, Treuting* Naturally occurring and experimentally induced analogs of human diseases in animals with emphasis on diseases in search of animal models, and approaches to identifying new models. Animal models of categorical disease (e.g., cancer, atherosclerosis, gerontology) discussed. Prerequisite: permission of instructor. Offered: Sp.

C MED 590 Selected Topics in Animal Medicine (2-5, max. 10) *Brabb, Iritani, Treuting* Radiation biology, genetics, anesthesiology and experimental surgery, preventive medicine, and ethical aspects of use of animals in biomedical teaching and research. Specific topics vary from year to year, depending on the expertise of the annual visiting professor. Prerequisite: permission of instructor. Offered: AWSpS.

C MED 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

C MED 601 Internship Rotation — Laboratory Animal Medicine (1-) Credit/no credit only. Prerequisite: DVM degree. Offered: AWSpS.

C MED 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

Conjoint Courses

CONJ 401 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 220; either CHEM 155, CHEM 160, or CHEM 162. Offered: A.

CONJ 402 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: CONJ 401. Offered: W.

CONJ 403 Human Anatomy and Physiology (4) *Linder, Melby* An integrated course on the structure and function of the human body with laboratory work in gross anatomy, histology, and physiology. Primarily for pharmacy doctoral students. Others by special permission of instructors. Prerequisite: CONJ 402. Offered: Sp.

CONJ 475 Alcoholism: A Course for Medical Students and Students in the Allied Health Sciences (2) *Kivlahan, Samson* A lecture course for medical students in the allied health sciences in any year that will cover an introduction to the epidemiology, diagnostic strategies, natural history, physiologic effects, and treatment of alcohol-related disorders. Offered: Sp.

CONJ 480 Neuroscience for Rehabilitation Professionals (5) *Anderson, Mulligan, Slimp* Survey of the structure and function of the central nervous system, emphasizing sensorimotor systems and higher integrative functions, coupled with clinical correlations. Required for occupational therapy, physical therapy, and prosthetic/orthotic students. Others by permission.

CONJ 505 P-Pain Clinic Preceptorship (1) One morning a week for a total of 30 hours per quarter spent observing patient care in either inpatient or outpatient settings at University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: Pain Center.

CONJ 514 Molecular Medicine (3) *Rosen* Graduate-level introduction to the interplay of basic science and clinical medicine. Covers inflammation, vascular disease, metabolic disorders, cancer biology, and molecular-, gene-, and cell-based therapies. Each topic introduced with a patient history. Offered: jointly with PATH 514; W.

CONJ 515 Interdisciplinary Health and Human Services Delivery in Rural Communities (1) *House* Provides opportunities for students in health and human services to explore current trends and issues of service delivery in rural communities. Demographics, economics, community structure, culture, and professional/personal issues are addressed. Prerequisite: major standing in a health or human services profession. Credit/no credit only. Offered: W.

CONJ 516 What Every Physician Should Know About Oral Health (1) *Lewis, Mouradian, Slayton* Didactic elective for students interested in understanding oral health and its relationship

to systemic health. Special interest to students planning careers in primary care, public health, or who are likely to practice in rural or underserved communities. Includes weekly seminars and clinical demonstrations. Credit/no credit only. Offered: Sp.

CONJ 520 Anatomy and Autopsy (1/2, max. 2) *Fligner* Students attend autopsies at UWMC affiliated hospitals for demonstration of normal anatomic relationships and gross pathological changes in various diseases. Offered as elective concurrent with HUBIO 520P. Prerequisite: HUBIO 510P or equivalent, permission of instructor, and orientation. Offered: WSp.

CONJ 524 Structural Basis of Signal Transduction (1.5) *Xu* Focuses on the structure-function relationship of key enzymes in signal transduction (protein/lipid kinases; phosphatases etc.) and the structural consequences of protein phosphorylation. Teaches students to look into critical structural details using PC or Mac. Prerequisite: undergraduate course in biochemistry and basic cell biology, or permission of instructor. Offered: W.

CONJ 531 Signaling Mechanisms in Excitable Cells (1.5) *Hille* Membrane electricity. Structure and roles of voltage-gated and ligand-gated ion channels in electrical signaling. Calcium as a second messenger. Exocytosis and its regulation. Phototransduction in photoreceptors. Prerequisite: comprehensive undergraduate course in general biochemistry and molecular biology, or permission of instructor. Offered: A.

CONJ 532 Signal Transduction from the Cell Membrane to the Nucleus (1.5) *Beavo, Moon, Storm* Intracellular signaling pathways leading from cell membrane receptors to nucleus. Pathways activated by seven transmembrane receptors and G-proteins, insulin/PI3 kinase, nitric oxide and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction. Prerequisite: basic knowledge of biochemistry. Offered: A.

CONJ 533 The Dynamic Chromosome (1.5) *Henikoff, Roth* The chromosome viewed as the ultimate organelle. How chromosomes are maintained and propagated. Epigenetic regulation of genes. Genetic, biochemical, and cytologic methods for understanding chromosome functions. Prerequisite: cell biology, biochemistry, and genetics. Offered: A.

CONJ 534 Selected Problems in Nervous System Development (1.5) Introduces students to current issues in developmental neurobiology. Topics include regionalization of the neuroectoderm, mechanisms of neurogenesis, axon patterning and plasticity, and cell death. Not intended to be comprehensive; examines the experimental basis for current views in the field of a few topical issues.

CONJ 535 RNA Structure and Biological Function (1.5) *Ferre-D'Amare, Stoddard* Survey of the diversity of cell-biological roles played by RNA with emphasis on structural principles and structure-function relationships. Readings from the current literature to cover both, methods for the study of RNA, and examples of the function of this nucleic acid as part of the machinery for gene expression. Offered: W.

CONJ 536 Experimental Design in Cell Biology (1.5) *Wakimoto, Wright, Hille, Cooper* Focuses on experimental design in cell biology. A topic of current research interest is covered in depth in order to follow a line of investigation and

critically evaluate the strengths and limitations of various experimental strategies. Offered: jointly with BIOL 546; W.

CONJ 537 Mechanism of Transcriptional Regulations (1.5) *Tsukiyama* Focuses on biochemical mechanisms of gene transcription covering a broad range of transcriptional regulation, including mechanisms of transcriptional initiation, elongation and termination. Discusses regulation of transcription by chromatin. Includes a special lecture regarding regulation of transcription in cell growth and differentiation. Offered: A.

CONJ 538 Genetic Instability and Cancer (1/1.5) *Maizels, Monnat* Seminar focusing on molecular pathways that maintain genomic stability in all cells and that carry out programmed changes in genomic structure in the immune system. Special attention devoted to understanding how failure in these pathways leads to genomic instability and malignancy. Prerequisite: permission of instructor.

CONJ 539 Biological Basis of Neoplasia (1.5) *Kemp, Zarbl* Lecture/discussion on cellular and molecular mechanisms underlying phenotypes associated with cancer, including genetic predisposition, injury, and instability; alteration in control of cell division and cell death; failure of differentiation; tumor angiogenesis and metastasis. Molecular biology of tractable model systems is emphasized. Prerequisite: introductory biochemistry and cell biology. Offered: S.

CONJ 541 Molecular Biology of Cellular Processes (1.5) *Bornstein* Translational control; cytoskeleton and molecular motors; protein targeting, sorting and secretion; apoptosis; regulation of cell function by extracellular matrix. Prerequisite: comprehensive undergraduate course in biochemistry and molecular biology or permission of instructor. Offered: Sp.

CONJ 542 Development (1.5) *Raible, Roelink* Molecular mechanisms of development; molecules and pathways used for the patterning of developing organisms. Similarities and differences in the making of plants, invertebrates, and vertebrates. Prerequisite: Comprehensive undergraduate courses in Biology, Molecular Biology, or permission of instructor. Offered: W.

CONJ 544 Protein Structure, Modification and Regulation (1.5) *Stoddard, Strong* Overview of general principles of protein structure, including forces that contribute to folding and stabilization, followed by an extended coverage of the means by which protein structure and function are modified and regulated. Examples from recent developments in protein folding, processing, and allosteric regulation. Prerequisite: introductory biochemistry and cell biology.

CONJ 545 Molecular Interactions and Medicine (1.5) *Verlinde* Forces governing molecular interactions in biology; with a focus on medicine. Principles of computer modeling techniques in use for predicting the molecular behavior of proteins, ligands and their complexes. In computo ligand discovery; drug design, and the understanding at the atomic level of some genetic diseases. Two computer lab sessions. Offered: Sp.

CONJ 546 Survey of Technologies for Molecular Biology (1.5) *Bumgarner* Provides a broad overview of modern technologies used in molecular biology with particular emphasis on DNA sequencing and gene expression. In

addition to methods and applications for the technologies, examines the theoretical basis and underlying instrumentation through which these technologies are implemented. Offered: A.

CONJ 547 Molecular Evolution of Viral-Host Interactions (1.5) *Katze* Focuses on the interactions between viruses and the cells they infect, with special emphasis on evolutionary battle that occurs between the invading virus and its host. Examines new technologies being used to molecularly dissect virus-host interactions. Offered: Sp.

CONJ 548 Modeling Proteins and Proteomes (1.5) *Samudrala* Provides hands-on experience for modeling protein structures, using the models to predict function, and applying the prediction methods to all proteins encoded by an organismal genome. Provides an overview of protein structure, how it mediates function, and its importance for understanding protein interaction networks. Offered: W.

CONJ 549 Microbial Population Biology (1.5) *Mittler* Principles of ecology and evolution as they apply to microorganisms. Prerequisite: advanced undergraduates with permission of instructor. Offered: even years; Sp.

CONJ 550 P-Clinical Infectious Diseases (3) *Spach* Lecture series by faculty members from various departments, authorities in the field of clinically important infectious diseases. Lectures, reading assignments, and handouts emphasize epidemiology, clinical manifestations, laboratory findings, diagnosis, treatment, and prevention. Oriented for second-year medical students. Credit/no credit only. Offered: W.

CONJ 551 Immunity (1.5) *Strong* Provides an understanding of the central cellular and molecular players in the mammalian immune system at a level appropriate for the non-specializing graduate student. Selected topics include the molecular basis of B and T cell activation and effector functions and the mechanisms of innate immunity. Offered: Sp.

CONJ 552 Metabolic Flexibility in Biology (1.5) Focuses on small molecules and the ways that chemistry of these molecules facilitates life under changing conditions. Includes systems from microbiology to human physiology to understand aspects of cancer, aging, and animation. Explores topics including bioenergetics/metabolic flux, adaptation, and allometric scaling. Prerequisite: undergraduate organic chemistry and biochemistry.

CONJ 585 Surgical Anatomy (1-3, max. 12) *Graney* Guided dissection of selected regions, supplemented by conferences. Offered conjointly by the departments of Biological Structure and Surgery. Prerequisite: permission of department. Coordinator: Department of Biological Structure.

CONJ 677 P-Clinical Allergy and Immunology (*, max. 12) *Callanan (Boise Veterans Affairs Hospital), Henderson (University of Washington Medical Center)* Clinic and office experience in diagnosing and managing allergic disease. Clinical conferences, hospital rounds on clinical immunology and allergy. Student may elect a flexible program, emphasizing adult or pediatric allergy. Prerequisite: MED 665 or basic clerkships in Departments of Family Medicine or Pediatrics. (Four weeks, full-time.) Offered: AWSpS.

CONJ 678 P-Pain Clinic Clerkship (8) Full-time,

four-week clerkship emphasizing comprehensive care of patients with chronic pain from benign diseases and cancer. Faculty members from multiple departments provide student with didactic and bedside experiences; student member of treatment team. Involves both inpatient and outpatient activities. Prerequisite: completion of human biology series, MED 665.

CONJ 680 P-Detoxification and Rehabilitation Program for Alcoholism and Drug Abuse (*, max. 16) *Reoux* Supervised introduction to alcoholic detoxification and rehabilitation and drug abuse. Supervised clinical experience in a variety of alcoholism and drug abuse treatment programs; accompanied by a core series of lectures and discussions. For medical students only. Prerequisite: PBSCI 664, PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

CONJ 690 P-Clerkship in Chronic Care (8) Exposure to four areas: Rehab Medicine, Geriatrics, Pain, and Palliative Care. While students choose one focus area; weekly group didactic sessions expose students to all areas through lectures, group discussions, standardized patients, and case scenarios. Offered: AWSpS.

CONJ 696 P-WRITE Clinical Electives (*, max. 24) Clinical electives for WRITE program. Offered: AWSpS.

CONJ 697 International Exchange Clerkship (12) *Hunt* Participation in health care delivery systems in developing countries; observation of relationship of host country's traditional medicine with Western medicine. Students live in cross-cultural setting to better understand their own assumptions about health care and life styles. Offered: Sp.

CONJ 698 P-Foreign Medical Student Clerkship (*, max. 24) A limited number of students from foreign medical schools are accepted for individually designed clinical clerkships at available sites after all UWMC students are accommodated. Prerequisite: permission of Associate Dean for Academic Affairs, School of Medicine.

CONJ 699 P-Clinical Clerkships (*, max. 32) .

Family Medicine

FAMED 499 Undergraduate Research (*) Research activities arranged with University-based or community physicians in diversified areas relating to family medicine. Prerequisite: permission of course coordinator. Offered: AWSpS.

FAMED 501 P-Introduction to Family Medicine: Preceptorship (2.5) Students spend one morning per week for one or more quarters working with a practicing community family physician. Prerequisite: first- and second-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 505 P-Rural/Urban Preceptorship (*, max. 12) Opportunity to work in a variety of underserved medical settings in rural and urban areas of Washington, Wyoming, Alaska, Idaho, and Montana. Prerequisite: permission of course coordinator. Offered: AWSpS.

FAMED 545 Preclinical Geriatric Elective (2) Covers disease and disability prevention, health promotion, and positive attitudes that can

contribute to successful aging. Emphasis on optimum aging, site visits, and extensive contact with diverse older people.

FAMED 546 Preclinical Hospice Volunteer Training Elective (3) Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with MHE 517.

FAMED 547 Spirituality in Medicine (2) Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with MHE 518.

FAMED 555 P-Wilderness Medicine (1/2) Elective provides didactic and field experience for third-year medical students in types of medical emergencies and clinical problems unique to rural and wilderness communities, including trauma, survival hypothermia, altitude, frostbite, heat illness, lightning, and river rescue. Credit/no credit only. Prerequisite: permission of course coordinator.

FAMED 556 Spanish for Health Professionals (1) Instruction in interviewing Spanish-speaking patient. Credit/no credit only. Prerequisite: health professions student.

FAMED 560 P-Indian Health Problem-Based Learning Cases (1) For second-year medical students. Presents common Indian health problems via problem-based learning cases over two to three days per case. Offered: A.

FAMED 630 P-WRITE Family Medicine Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program. .

FAMED 640 P-Clinical Clerkship in Family Medicine — Boise (12) Stresses ambulatory primary care with emphasis on comprehensive, integrated care to patients of both genders and all ages. Student functions as clerk in community/residency site. Participates in care of assigned patients, using office, hospital, home, community resources. Prerequisite: third- or fourth-year medical students. Offered: AWSpS.

FAMED 641 P-Clinical Clerkship in Family Medicine — Spokane (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 642 P-Clinical Clerkship in Family Medicine — Madigan (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 643 P-Clinical Clerkship in Family Medicine — Tacoma (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 644 P-Clinical Clerkship in Family Medicine — University of Washington Medical Center (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 645 P-Clinical Clerkship in Family Medicine — Group Health (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 646 P-Clinical Clerkship in Family Medicine — Swedish (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 647 P-Clinical Clerkship in Family Medicine — Providence (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 648 P-Clinical Clerkship in Family Medicine — Renton Valley (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 649 P-Clinical Clerkship in Family Medicine — Olympia (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 650 P-Clinical Clerkship in Family Medicine — Anacortes (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 651 P-Clinical Clerkship in Family Medicine — Omak (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 652 P-Clinical Clerkship in Family Medicine — Spokane Valley (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 653 P-Clinical Clerkship in Family Medicine — Anchorage (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 655 P-Clinical Clerkship in Family Medicine — Havre (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 656 P-Clinical Clerkship in Family Medicine — Whitefish (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 657 P-Clinical Clerkship in Family Medicine — Pocatello (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 658 P-Clinical Clerkship in Family Medicine — Sea Mar Clinic (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 659 P-Clinical Clerkship in Family Medicine — Country Doctor (12) For description and prerequisite, see 640. Offered: AWSpS.

FAMED 660 P-Clinical Clerkship in Family Medicine — Yakima (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 661 P-Clinical Clerkship in Family Medicine — Bremerton (12) For description and prerequisites, see 640. Offered: AWSpS.

FAMED 670 P-Advanced Preceptorship in Underserved WWAMI Area (*, max. 24) Students gain experience, knowledge, and skills needed to care for rural, specific ethnic or underserved populations in Washington, Wyoming, Alaska, Montana, and Idaho. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 671 P-Advanced Preceptorship in United States (*, max. 24) Supplemental experience in rural/urban practice or a family medicine department in a setting not already established through the family medicine curriculum. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 672 P-Advanced Preceptorship International (*, max. 24) For medical students desiring primary care experience abroad. Special project deals with influences of social, cultural, educational, and economic forces on health care delivery. Prerequisite: third- or fourth-year medical students, permission of course coordinator. Offered: AWSpS.

FAMED 673 P-Advanced Preceptorship at WWAMI Clinical Centers (*, max. 12)

Supplemental experience in Family Medicine for late junior or senior medical students at selected WWAMI clinical centers. Prerequisite: completion of basic 6-week clerkship in Family Medicine. Offered: AWSpS.

FAMED 674 Advanced Interviewing in Primary Care (8)

Emphasizes the learning of patient-centered interviewing and counseling skills necessary for effective practice of primary care medicine. Prerequisite: permission of course coordinator.

FAMED 675 P-Clinical Elective in Complementary and Alternative Medicine (8)

Clinical elective for students interested in a better understanding of CAM. Includes four different weekly clinical placements with selected CAM providers in the community: naturopathic physician, chiropractor, acupuncturist, and massage therapist. Also includes a weekly two-hour seminar discussing the evidence supporting the use of alternative treatments.

FAMED 680 P-Traditional Indian Medicine Clerkship in Primary Care Setting (*, max. 16)

Students learn how Western physicians collaborate with traditional Indian healers in the provision of health care to an urban Indian population. Prerequisite: completion of required third-year clerkship, UCONJ 530 or permission of instructor. Offered: AWSpS.

FAMED 681 P-Indian Health Care Clerkship (*, max. 16)

Individually designed learning experience allows student to choose training opportunities, including Indian IHS Clinics, Tribal 638 Health Programs, IHS Public Health Program, Urban Indian Health programs, Tribal Council Health activities, and Tribal/IHS Alcoholism Treatment programs. Prerequisite: completion of required third-year clerkships, UCONJ 530, and permission of instructor. Offered: AWSpS.

FAMED 688 P-Family Medicine Subinternship (8)

Students serve as interns for Family Medicine services associated with residency programs under the supervision of family medicine residents and attending physicians. Schedules mix inpatient and ambulatory experiences as determined by the site and the student has the same call as R-1 on service.

FAMED 698 P-Clinical Clerkship in Family Medicine, Away (12)

For description and prerequisites, see 640. Offered: AWSpS.

FAMED 699 P-WWAMI Family Medicine Special Electives (*, max. 24)

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of course coordinator. Offered: AWSpS.

Genome Sciences

GENOME 261 Genomes and Society (4) NW

Schivel Explores current technological advances in genome research and how these advances are impacting society. Topics include sequencing of the human genome, stem cell research, cloning, genetically modified foods, immunizations/public health, and genetic therapy. Appropriate for non-science majors. Offered: W.

GENOME 351 Human Genetics: The Individual and Society (4) NW

Principles of Mendelian inheritance as illustrated by human traits and diseases; chromosomes and sex determination; distribution of genes in populations; natural selection and evolution; counseling and genetic engineering; ethical issues. Appropriate for non-science majors. Offered: W.

GENOME 371 Introductory Genetics (5) NW

Covers gene transmission, including chromosome mapping, genetic pathways; mutational analysis biological processes emphasizing mutations affecting chromosome transmission. Introduction to genomics—cloning and sequence analysis of whole genomes. Emphasizes formal genetic mechanisms, molecular techniques. For biological sciences majors. Prerequisite: minimum grade of 1.5 in BIOL 180; minimum grade of 1.5 in either BIOL 200 or BIOL 201; may not be repeated. Offered: AWSpS.

GENOME 372 Gene Structure and Function (5) NW

Explores the structure of genes and genomes, the mechanism and control of transcription and translation, the molecular mechanisms of mutation, transposition and cancer, and the identification of human disease genes. Prerequisite: GENOME 371. Offered: W.

GENOME 373 Genomic Informatics (4) NW

Focuses on methods for analyzing large genetic data sets and their application to biological problems, including sequence alignment and search methods, gene prediction, phylogenetic trees, and microarray analysis. Requires basic programming skills.

GENOME 411 Gene Action (5) NW

Molecular genetics: description of fundamental genetics processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focus is on prokaryotic organisms. Prerequisite: BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with MICROM 411; W.

GENOME 414 Molecular Evolution (5) NW

Survey of empirical approaches to the study of molecular evolution and ecology, drawing on examples from a variety of taxa and the recent literature. Topics include DNA sequencing and systematics, fingerprinting approaches in behavioral ecology, and adaptive evolution at the molecular level. Prerequisite: BIOL 354. Offered: jointly with BIOL 414.

GENOME 453 Genetics of the Evolutionary Process (3) NW

Contributions of genetics to the understanding of evolution. Processes of mutation, selection, and random genetic events as they affect the genetic architecture of natural populations and the process of speciation. Emphasis on experimental data and observation, rather than mathematical theory. Prerequisite: either GENOME 371 or GENOME 372.

GENOME 454 The Origins of Genetics (4) NW

Discovery and eventual triumph of Mendelism in the early twentieth century. Concepts of heredity from ancient times to the nineteenth century. Mendel's work and its rediscovery. Evidence contributing to cornerstone of classical genetics—the chromosome theory of heredity. Prerequisite: either GENOME 351, GENOME 371, or GENOME 372. Offered: A.

GENOME 465 Advanced Human Genetics (4) NW

King, Olson Explores genetic analysis of naturally occurring variation in humans; origins

and consequences of mutation, as mediated by selection, migration, population structure and drift; approaches to finding human disease genes and characterizing them at the molecular level; relevance of other species to analysis of human genes. Prerequisite: GENOME 371; either GENOME 372 or BIOC 440. Offered: W.

GENOME 466 Cancer Genetics (3) NW

Focuses on three types of cancer-related genetics. DNA repair, mitotic recombination, chromosome loss and imbalance, and other aspects of genomic instability. Metastatic cancer as an example of natural selection and evolution. Yeast and nematodes as models for the study of cancer genetics. Prerequisite: either GENOME 371 or GENOME 372. Offered: odd years.

GENOME 475 Debates in Genetics(3)

Utilizes the original scientific literature as the basis for discussion of a range of genetic issues that impact society. Discussions are student-led; evaluations are based both on participation in class and on a research paper. Prerequisite: BIOL 200; either GENET 371 or GENOME 371.

GENOME 490 Undergraduate Seminar (2, max. 6) NW

Seminar for advanced undergraduate students engaged in individual research projects or those who wish to gain an understanding of genetic research by analysis of the primary literature. Assignments emphasize the rationale for research projects and the presentation and interpretation of research findings. Offered: AWSp.

GENOME 496 Peer Teaching Assistants in Genome Sciences (1-5, max. 5)

Direct experience in the classroom teaching a discussion section for non-majors in genome sciences courses. Peer teaching assistants attend lectures and weekly preparation meetings and gain in-depth background on the subject material. In addition, peer TAs are given training in teaching techniques and course preparation. Credit/no credit only. Prerequisite: GENOME 371.

GENOME 499 Undergraduate Research (*, max. 30)

Credit/no credit only. Offered: AWSpS.

GENOME 501 Introduction to Research Materials (1-10)

The student undertakes a research project in one of the research groups within the department for a quarter at a time. Credit/no credit only. Prerequisite: graduate standing in the Department of Genome Sciences or permission of graduate program coordinator. Offered: AWSpS.

GENOME 503 An Inquiry Approach to Teaching Genetics at the Introductory High School Level (2, max. 6)

Provides advanced science content on topics in genetics and bioethics that are taught in secondary biology classrooms, as well as pedagogical strategies for conveying concepts to pre-college students. Workshop participation required.

GENOME 504 StarNet: Research Experiences for Students and Teachers (3, max. 9)

Explores the scientific knowledge, technical skills, and pedagogical strategies related to teaching DNA sequencing and bioethics in a high school classroom. Workshop participation required.

GENOME 505 StarNet: Teacher Research Experience (9)

Participating teachers carry out an independent research project in a University of Washington laboratory. Teachers, scientists,

and StarNet staff meet weekly for an informal research talk.

GENOME 506 The Science Education Partnership (5, max. 15) Provides secondary school teachers training in molecular biology, genetics and biotechnology, as well as resources and ongoing support designed to enhance biology instruction. Workshop participation required.

GENOME 520 Seminar (1, max. 15) Credit/no credit only. Prerequisite: graduate standing in the Department of Genome Sciences or permission of graduate program coordinator. Offered: AWSp.

GENOME 525 Current Literature in Human Genetics (1) Topics from current literature in human genetics. Students and faculty each present one topic per quarter. Credit/no credit only. Prerequisite: graduate or postdoctoral status. Offered: AWSp.

GENOME 540 Introduction to Computational Molecular Biology: Genome and Protein Sequence Analysis (4) Algorithmic and probabilistic methods for analysis of DNA and protein analysis. Students must be able to write computer programs for data analysis. Prior coursework in biology and probability highly desirable. Prerequisite: permission of instructor. Offered: W.

GENOME 541 Introduction to Computational Molecular Biology: Molecular Evolution (4) Computational methods for studying molecular evolution. Students must be able to write computer programs for data analysis. Prior coursework in biology and probability highly desirable. Prerequisite: MBT/GENOME 540 or permission of instructor. Offered: Sp.

GENOME 547 Scientific Writing (1.5) For graduate students principally in their second and third year. Focuses on the preparation of research manuscripts for publication. Also considers other scientific writing such as thesis proposals and fellowship and grant applications.

GENOME 549 Molecular Basis of Neurodegenerative Disease (2) *La Spada, Muchowski, Pallanck* Introduces a broad range of neurodegenerative diseases, focusing upon the approaches that have led to recent discoveries and emphasizing the elucidation of mechanisms and pathways of disease pathogenesis. Offered: jointly with NEUBEH 549/PHCOL 549; W.

GENOME 550 Methods and Logic in Genetics (3) Critical reading and detailed discussion of genetics-related scientific research papers. Material emphasizes methodological and logical themes of importance in modern genetics, for example: origin of mutants, genetic epistasis, pulse labeling, and in vivo gene function. Prerequisite: first-year genetics graduate students only. Offered: A.

GENOME 551 Mechanisms of Gene Regulation in Prokaryotes and Eukaryotes (1.5) I&S A detailed examination of the mechanisms of transcription and translation in prokaryotes and eukaryotes as determined by experimental genetics, molecular biology and biochemistry.

GENOME 552 Technologies for Genome Analysis (1.5) Discussion of current and newly-emerging technologies in genome analysis with regard to applications in biology and medicine and to potential advantages and limitations. Prerequisite: permission of instructor. Offered: A.

GENOME 553 Advanced Genetic Analysis (1.5) Classical genetic analysis is a powerful approach to dissect complex biological processes. Selective removal, addition, or alteration of specific proteins to identify and order genes in a pathway, define protein function, determine tissue and temporal requirements for gene function, and distinguish among competing hypotheses to explain biological phenomena.

GENOME 554 Genomic Informatics (1.5) Many complete genome sequences are known. Each of these encodes the instructions for making an entire organism, but how can we hope to decipher the code? Focuses on methods for analyzing genome sequences, ranging from large-scale organizational pattern to gene prediction and detailed local alignment methods.

GENOME 555 Protein Technology (1.5) Focuses on current and emerging technologies and approaches in protein analysis, and considers applications of these technologies in biology, biotechnology and medicine. Prerequisite: BIOC 440; GENOME 551; GENOME 552; GENOME 553; GENOME 554.

GENOME 556 Developmental Genetics (1.5) Genetic control of early development in a range of organisms, emphasizing systems in which cellular, genetic, and molecular approaches have combined to make significant contributions to understanding. Prerequisite: permission of instructor. Offered: W.

GENOME 557 Meiosis (1.5) A comprehensive consideration of meiotic mechanisms emerging from genetic and molecular analysis of model organisms focuses on the molecular basis of chromosomal synapsis, homologous recombination, and meiotic disjunction. The relationship of these mechanisms to the structure of the human genome and the analysis of complex traits are also considered.

GENOME 559 Introduction to Statistical and Computational Genomics (1.5) Rudiments of statistical and computational genomics. Emphasis on basic probability and statistics, introduction to computer programming, and relevant Web databases.

GENOME 561 Molecular Population Genetics and Evolution (1.5) Surveys recent literature to gain an understanding of the basic principles of molecular population genetics and evolution as applied to analysis of genome data. Requires some computer analysis of genome data.

GENOME 562 Population Genetics (4) *Felsenstein* Mathematical and experimental approaches to the genetics of natural populations, especially as they relate to evolution. Emphasis on theoretical population genetics. Prerequisite: permission of instructor. Offered: Sp.

GENOME 570 Phylogenetic Inference (3) *Felsenstein* Methods for inferring phylogenies (evolutionary trees) — biological assumptions, statistical foundations, and computational methods. A comprehensive introduction for graduate students in the biological sciences to phylogenetic methods using data from molecular sequences, continuous and discrete characters, and gene frequencies. Prerequisite: introductory courses in evolution and in statistics. Offered: alternate years; Sp.

GENOME 576 Genetic and Genomic Analysis of Bacteria (1.5) In-depth coverage of genetic and genomic strategies used to analyze complex

biological processes in bacteria. Focuses on general approaches, with examples drawn from studies of pathogenic organisms where possible. A combination of lectures and seminar-style discussions of primary literature.

GENOME 580 Ethics in Biomedical Research and Teaching (1) Explores ethical issues in research and teaching and discusses avenues of responsible conduct.

GENOME 581 Seminar in Drosophila Genetics (1) *Berg* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of Drosophila development. Credit/no credit only. Offered: AWSp.

GENOME 582 Seminar in Mouse Genetics (1) *Braun* Discussion of contemporary research in and novel methods for genetic, cell biological, and molecular analysis of mammalian development, with utilization of transgenic techniques. Credit/no credit only. Offered: AWSp.

GENOME 583 Seminar in Molecular Cytology (1) *Byers* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of spindle behavior in the mitotic cell cycle of budding yeast. Credit/no credit only. Offered: AWSp.

GENOME 584 Seminar in DNA Replication (1) *Brewer, Fangman* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of budding yeast, with emphasis on the mechanisms and control of DNA replication. Credit/no credit only. Offered: AWSp.

GENOME 585 Seminar in Bacterial Genetics (1) *Manoil* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of bacterial assembly mechanisms, with emphasis on the topogenesis of membrane proteins. Credit/no credit only. Offered: AWSp.

GENOME 586 Seminar in Mammalian Genetics (1) *Sibley* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of mammalian genetics, with emphasis on lymphoblast development. Credit/no credit only. Offered: AWSp.

GENOME 587 Seminar in Nematode Genetics (1) *Thomas* Discussions of contemporary research in and novel methods for genetic, cell biological, and molecular biological analysis of nematode development, with emphasis on neurogenesis and other developmental processes. Credit/no credit only. Offered: AWSp.

GENOME 590 Population Genetics Seminar (1) *Felsenstein* Weekly presentation by participants of current literature and ongoing research in evolution, molecular evolution, evolutionary genetics of natural populations, human population genetics, and quantitative genetics applied to animal and plant breeding. Credit/no credit only. Prerequisite: GENOME 562 or permission of instructor.

GENOME 599 Special Topics in Molecular Biotechnology (*, max. 12) Prerequisite: permission of instructor. Offered: AWSp.

GENOME 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

GENOME 700 Master's Thesis (*) Offered: AWSpS.

GENOME 800 Doctoral Dissertation (*)
Offered: AWSpS.

Human Biology

HUBIO 500 P-Medical Practice Preceptorship at WWAMI Sites (1, max. 3) Personal experience with, and insight into, medical practice situations. Student is stationed with carefully selected clinical faculty members in their offices in accordance with the student's preference of discipline at the WWAMI sites. Registration limited to first-year medical students at WWAMI sites. Offered: AWSpS.

HUBIO 501 P-Human Biology Special Projects (*) *MacLaren* Designed for medical students electing a special study project related to the Introduction to Clinical Medicine or other human biology courses, which are offered during the first and second years in the School of Medicine. Primarily intended for students in remedial or extended programs. Prerequisite: permission of assistant dean for curriculum. Offered: AWSpS.

HUBIO 505 P-WWAMI Preceptorship (1) Opportunity for first-year medical students at WWAMI sites to gain personal experience with medical practice situations by being assigned to selected clinical faculty members in their offices. Offered: ASP.

HUBIO 510 P-Microscopic Anatomy: Histology (6) *Farr* Lectures and laboratories in microscopic anatomy designed to provide the principles and concepts of histology, to define the morphological characteristics of the cells, tissues, and organs of the human body, and to relate this information to functional processes studied in concurrent and subsequent courses. Offered: A.

HUBIO 511 P-Gross Anatomy and Embryology (8/13, max. 13) *Clark* Structural organization of human body at the macroscopic level to provide a foundation for physical examination and functional assessment of the human organism. Integrates embryological development with study of the cadaver and examination of the normal living body. Concentrates on exploration of the body cavities and the viscera they contain. Offered: A.

HUBIO 512 P-Mechanisms in Cell Physiology (5) *Detwiler* Physiology of the cell membrane, including ionic and electrical potential gradients; active transport, excitability, and action potentials; biophysics of sensory receptors; neuromuscular transmission; muscle energetics and contractility; spinal reflexes and central synaptic transmission; autonomic nervous system; energy metabolism and temperature regulation; epithelial transport; gastrointestinal motility and secretions. Offered: A.

HUBIO 513 P-Introduction to Clinical Medicine (3-) *Goldstein* Instruction in communication skills and interview techniques to form the basis for the doctor-patient relationship and for the skills of communicating with patients. The patient profile is obtained. Attention to developing comfort in the physician role. Offered: A.

HUBIO 514 P-Biochemistry I-A (4-) *Maizels* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic interrelationships as they occur in the individual stressed and related to disturbances in disease states. Offered: A.

HUBIO 516 P-Systems of Human Behavior I-A (3-) *Murray, Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: A.

HUBIO 520 P- Molecular and Cellular Basis of Disease (6) *Norwood* Patterns of cell and tissue response to injury. Mechanisms of cell injury, the inflammatory process, immunology, immunopathology, thrombosis, normal and abnormal growth, neoplasia, clinicopathological correlation. Offered: W.

HUBIO 522 P-Introduction to Clinical Medicine (-4-) *Goldstein* Medical history is introduced and instruction in data collection is begun. Experience in conducting medical interviews with patients to obtain the medical history and patient profile. Special problems related to interviewing are addressed. Offered: W.

HUBIO 523 P-Introduction to Immunology (2) *Wilson* Basic concepts such as antigens; antibodies; complement; B- and T-lymphocyte function, including interactions with each other and with accessory cells; immunological tolerance; major histocompatibility complex; and role of these basic concepts in immunopathology (immunodeficiencies, hypersensitivities, autoimmunity, blood transfusion, and transplantation). Offered: W.

HUBIO 524 P-Biochemistry I-B (-4) *Maizels* Classical molecular and cellular biochemistry, cellular physiology and molecular genetics. Metabolic interrelationships as they occur in the individual stressed and related to disturbances in disease states. Offered: W.

HUBIO 526 P-Systems of Human Behavior I-B (-2) *Johnston, Walker* Effects of behavioral factors in major management problems faced in medical practice relating to cultural background, social role, sexual identity, and belief systems. Acquisition of skills in analyzing behavior, defining objectives, and designing precise treatment strategies. Offered: W.

HUBIO 530 P-Clinical Epidemiology and Evidence-Based Medicine (2) *Kestenbaum* Community health and disease, including assessment of disease risk and mechanisms of epidemic detection, spread, and control; interpretation of research design, data analysis, bias source; and clinical epidemiology, including evaluation and application of diagnostic tests, natural history of disease, and quantitative aids for clinical decision making. Offered: W.

HUBIO 531 P-Head, Neck, Ear, Nose, and Throat (5) .

HUBIO 532 P-Nervous System (8) *Dacey, Mulligan* An integrated approach to the normal structure and function of the nervous system, including the eye. Presents neuropathological examples as well as clinical manifestations of neurological disease.

HUBIO 534 P-Microbiology and Infectious Disease (9) *Moseley* An introduction to medical microbiology and infectious diseases. Emphasizes the biology of microbial pathogens and the mechanisms of pathogenesis. Covers clinical manifestations, epidemiology, general principles

of diagnosis, therapy, and prevention of infectious disease. Offered: Sp.

HUBIO 535 P-Introduction to Clinical Medicine (-4) *Goldstein* Adult screening physical examination is taught through the use of lecture, audiovisual aids, and small-group tutorial, where students in supervised setting practice the physical examination on one other. Further practice in the performance and recording of the patient profile and medical history. Offered: Sp.

HUBIO 540 P-Cardiovascular System (6) *Feigl* Interdisciplinary approach to cardiovascular medicine, including anatomy, physiology, radiology, pathology, medicine, and surgery. Function of the cardiovascular system in health and disease. Offered: A.

HUBIO 541 P-Respiratory System (4) *Culver* Interdisciplinary approach to the respiratory system, including anatomy of thorax and lungs, ventilation mechanics, blood-gas transport, gas exchange, acid-base balance, and the physiology and pathology of obstructive, restrictive, and pulmonary-vascular diseases. Offered: A.

HUBIO 542 P-Introduction to Clinical Medicine (4-) *Goldstein* Advanced instruction in interview technique, history taking, and physical examination, with emphasis on detection of abnormalities. Offered: A.

HUBIO 543 P-Principles of Pharmacology I (5) *Vincenzi* Includes general principles of pharmacology and the specific pharmacology of major drugs acting on the autonomic and cardiovascular systems. Offered: A.

HUBIO 544 P-Endocrine System (3) *Anawalt* Normal, gross, and microscopic anatomy and physiology of the endocrine system. Illustrations examining the clinical relevance of homeostasis, feedback, and other controlling mechanisms previously learned. Endocrine integration of metabolism. Clinically important endocrine pathophysiology. Offered: A.

HUBIO 546 P-Systemic Pathology (4) *Schmidt* Multidisciplinary approach to some diseases that affect more than one organ system (nervous, cardiovascular, respiratory) and that are caused by different mechanisms (congenital, inflammatory, vascular, traumatic, metabolic, neoplastic). Offered: Sp.

HUBIO 550 P-Introduction to Clinical Medicine (-4-) *Goldstein* Advanced instruction in interview technique, history taking, and physical examination, with emphasis on identification of problems and correlation of findings with pathophysiological mechanisms. Offered: W.

HUBIO 551 P-Gastro-Intestinal System (4) *Saunders* Anatomy of the gastrointestinal system; physiology and pathology of digestion and hepatic function; and physical and laboratory examination. Offered: W.

HUBIO 552 P-Hematology (3) *Becker* Familiarizes students with the basic pathophysiologic mechanisms leading to disturbances of red cell, white cell, and platelet production, as well as abnormalities of hemostasis presenting clinical problems. Pathophysiology, rather than minute details of individual disease, is stressed. Offered: W.

HUBIO 553 P-Musculoskeletal System (4) *Schmale* Gross, surface, applied, and radiographic anatomy. Clinical manifestations in the

musculoskeletal system and pathophysiology of trauma, aging, infection, and inflammation, as well as congenital and metabolic disorders. Dissections, physical examinations, and problem based learning. Offered: W.

HUBIO 554 P-Genetics (2) *Horwitz* Review of basic genetic principles and their applications in clinical medicine. Includes human chromosomal disorders; patterns of inheritance, genetic counseling, amniocentesis; pathogenesis of hereditary diseases, monogenic and multifactorial; role of genetics in common diseases; behavioral genetics; drug-gene interactions; and prevention and treatment of genetic diseases, including prenatal diagnosis and population screening. Offered: A.

HUBIO 555 P-Medicine, Health, and Society (3) *Harris* Interdisciplinary introduction to health services designed for future health care practitioners. Examines the history, organization, and effectiveness of the U.S. health care system. Stresses the student's ability to adopt a broad perspective across health care disciplines and traditional boundaries. Offered: W.

HUBIO 559 P-Problem Based Learning (3) *Teitz* Teaches students to methodically solve medical problems by gathering, sorting, and interpreting data. Students learn life-long self-education and self-evaluation skills. Provides practice working as a health care team by including medical, nursing, and physician assistant students in each group. Offered: W.

HUBIO 560 P-Introduction to Clinical Medicine (-5) *Goldstein* Introduction to clinical and laboratory diagnosis. Offered: Sp.

HUBIO 562 P-Urinary System (4) *Ryan* Anatomy, physiology, and pathology of the kidney, ureter, bladder, and prostate; pathophysiology and treatment of common fluid and electrolyte problems; renal pharmacology; major clinical urinary system syndromes, with current diagnostic approaches and therapy. Offered: Sp.

HUBIO 563 P-Brain and Behavior (3) *Pascualy* Major psychiatric disorders are defined and described, and a systematic approach to differential diagnosis is presented. Conceptual development, pathogenesis, epidemiology, nomenclature, and the terminology used in psychiatry are discussed. Offered: Sp.

HUBIO 564 P-Principles of Pharmacology II (3) *Chavkin* Lectures and conferences on drugs that act on the central nervous system. Emphasis on physiological and biochemical mechanisms, with consideration of therapeutic and adverse effects. Offered: Sp.

HUBIO 565 P-Reproduction (4) *Steiner* Normal development of the human reproductive system. Sexual differentiation, puberty, endocrine control of testicular and ovarian function, gamete biology, fertilization, implantation, immunology and endocrinology of pregnancy, labor and delivery, pathology of the male and female reproductive organs, contraception, prolactin and lactation, aging and infertility. Offered: Sp.

HUBIO 567 P-Skin System (2) *Colven* Gross and microscopic anatomy. Physiology, protection, temperature control, pigmentation, and photosensitivity. Pathology and genetics of skin abnormalities, including tumors. Introduction to clinical evaluation, including physical examination and illustrating examples of inflammatory, vascular, immunological (including drug

hypersensitivity), and neoplastic diseases. Offered: A.

HUBIO 568 Clinical Nutrition (1) *Lipkin* Principles and practice of clinical nutrition, including role of nutrients in normal growth and development, pathogenesis of chronic disease, and nutrition in the management of certain disease states. Offered: Sp.

HUBIO 590 P-Introduction to Critical Reading and Evaluation of the Medical Literature (1) *Wolf* An introduction to methods for identifying and retrieving Web-based high quality, relevant evidence, and to methods for describing and applying rigorous criteria when reading primary research studies or reviews of primary studies that report on the effectiveness of therapeutic or preventive interventions. Prerequisite: first-year medical student standing. Offered: W.

HUBIO 596 P-WWAMI Non-Clinical Selectives II (*) .

HUBIO 597 P-Independent Investigative Inquiry (8) Independent research with faculty sponsor and completion of paper in fulfillment of the independent investigative inquiry graduation requirement. Offered: Sp.

HUBIO 598 P-WWAMI Non-Clinical Selectives (*) Courses offered at WWAMI university sites designed to satisfy the non-clinical selective graduation requirement for medical students. Offered: AWSp.

HUBIO 599 P-Independent Study in Medical Science (6) *Marshall* Independent research with faculty sponsor and completion of paper as partial fulfillment of non-clinical selective graduation requirement. Offered: Sp.

HUBIO 600 PA-Capstone Course: Preparation for Residency (2, max. 4) *Norris* A combination of large group lectures and small group discussions and workshops reviewing clinical skills in history-taking and physical examinations, imaging studies, common and emergency drugs, ACLS, infectious disease control, common clinical problems, and other topics that are encountered in residency training. Offered: Sp.

Immunology

IMMUN 441 Introduction to Immunology (4) *NW* General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: either BIOL 220 or BIOL 202; may not be repeated; recommended: GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with MICROM 441; A.

IMMUN 499 Undergraduate Research (*, max. 24) Investigative work on a variety of topics, including mechanisms of antigen recognition, T-cell development and differentiation, immunogenetics, lymphocyte activation, MHC gene structure and function, retrovirology, and the pathogenesis of autoimmune diseases, among others. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 532 Advanced Immunology (4) Examines the molecular and cellular basis of immune function. Students must have completed a baccalaureate degree in a biological specialty and be conversant with molecular genetics.

Topics include: hematopoiesis, antigen receptor structure, lymphocyte development, antigen presentation, and cytokines. Offered: W.

IMMUN 533 Host Defense to Cancer (2) *Clark, Mccune* Addresses the mechanisms of cellular homeostasis, balancing cells of immune system, programmed cell death, immune surveillance, cancer immunotherapy. Companion course with IMMUN 535. Prerequisite: graduate standing in immunology; other graduate students with permission of instructor. Offered: odd years, Sp, weeks 1-5.

IMMUN 534 Central Issues in Immunology (2, max. 4) Presentations by participants of topics relating to the broad study of immunology. Prerequisite: graduate standing in Immunology. Offered: Sp.

IMMUN 535 Host Defense to Infection (2) *Clark, Mccune* Addresses the mechanisms protecting against pathogens that infect patients with cancers; immune regulation; new developments in vaccines. Companion course with IMMUN 533. Prerequisite: graduate standing in Immunology; other graduate students with permission of instructor. Offered: even years, Sp, weeks 1-5.

<t>**Current Research Conferences** Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter.

IMMUN 550 Selected Topics in Immunology (1, max. 30) Formal seminar-discussion course for advanced students focused on recent developments in the field and consisting of literature research and intensive in-depth study of important and timely topics. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

IMMUN 551 Regulation of T Cell-Dependent B Cell Maturation (1, max. 30) *Clark* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 552 Immunogenetics and Autoimmunity (1, max. 30) *Concannon* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 553 Recombination and Repair in B Cell Development (1, max. 30) *Maizels* Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 554 Immunogenetic Aspects of Human Autoimmunity (1, max. 30) *Nepom* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 555 Model of Autoimmune Disease and Their Regulation (1, max. 30) *Goverman* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 556 Research in Conference in Regulation of Autoimmunity and Allergic Inflammation (1, max. 30) *Ziegler* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter. Credit/no credit only.

Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 557 Thymic Environment (1, max. 30) *Farr* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 558 Research Conference in Apoptosis and Autoimmunity (1, max. 30) *Elkon* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter Credit/no credit only. Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 559 Cytokine Gene Regulation (1, max. 30) *Bix* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 560 Progress in T Cell Research (1, max. 30) *Bevan, Fink, Rudensky* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 561 Mechanisms of Peripheral Tolerance (1, max. 30) *Fink* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 562 Developmental Regulation of T Cell Function (1, max. 30) *Wilson* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 563 Macrophage Biology: Signaling and Phagocytosis (1, max. 30) *Aderem* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 564 Cellular/Molecular Regulation of T Cell Responses (1, max. 30) *Greenberg* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 565 Signaling and Costimulatory Regulation of T Cell Function (1, max. 30) *Dong* Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Students may register for more than one conference each quarter. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 566 Role of Innate Mechanisms in Generation and Maintenance of Protective Immune Memory (1, max. 30) *Kaja* Weekly group conferences concerning ongoing graduate students and postdoctoral research in immunology. Credit/no credit only. Offered: AWSpS.

IMMUN 567 Antigen Processing and Presentation (1, max. 30) *Rudensky* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 568 Antibody Structure and Function (1, max. 30) *Foote* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 569 Genetics of Diabetes (1, max. 30) *Lernmark* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 570 Cytokine Signaling in Lymphocytes (1, max. 30) *Nelson* Credit/no credit only. Prerequisite: graduate standing in Immunology.

IMMUN 571 Research Conference in Development and Activation of B Cells (1,

max. 30) *Rawlings* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter Credit/no credit only. Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 572 Research Conference in Signal Transduction in B-Cells (1 max. 30) *Scharenberg* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter Credit/no credit only. Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 573 Immunology Seminar Series (1, max. 30) Weekly discussion in which original research results are presented and discussed. Emphasis is on new and original contributions to field of immunology and related areas; occasional seminars are concerned with review of important topics. Credit/no credit only. Prerequisite: firm background in immunology, permission of instructor. Offered: AWSp.

IMMUN 574 Research Conference in Kaposi's Sarcoma-Associated Herpesvirus: Interactions with B-Cells and Endothelial Cells (1, max. 30) *Lagunoff* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter Credit/no credit only. Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 575 Research Conference in Infection and Immunity (1, max. 30) *Bevan* Weekly group conferences concerning ongoing graduate student and postdoctoral research in immunology. Students may register for more than one conference each quarter Credit/no credit only. Prerequisite: immunology graduate students only; permission of instructor. Offered: AWSPS.

IMMUN 576 Transcriptional Regulation in the Immune System (1, max. 30) *Weinmann* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 577 Lymphocyte Homing and Function (1, max. 30) *Campbell* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 578 Immunology and the Pathogenesis of Tuberculosis (1, max. 30) *Ramakrishnan* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 579 Costimulation and Autoimmune Disease (1, max. 30) *Latchman* Credit/no credit only. Prerequisite: graduate standing in Immunology. Offered: AWSpS.

IMMUN 599 Introduction to Immunology Research (1-7, max. 7) Current problems in immunological research. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

IMMUN 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

IMMUN 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

IMMUN 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Laboratory Medicine

LAB M 321 Medical Technology: Introductory Clinical Hematology (6) *McDonnell* Lecture and laboratory coverage of theoretical and practical aspects important in the evaluation of blood cells, to include their production, morphology, function, and associated pathology. Instrumentation used in testing included, as well as quality control and quality assurance issues. Offered: W.

LAB M 322 Medical Technology: Introductory Clinical Chemistry (5) *Chen-Levy* Lecture and laboratory covering the theoretical and practical concepts associated with testing procedures performed in clinical chemistry. Offered: A.

LAB M 418 Topics in Clinical Chemistry (5) *Chen-Levy* Continuation of LAB M 322. Lecture and laboratory exercises covering fundamentals of instrumentation and methodology in the clinical chemistry laboratory. Offered: Sp.

LAB M 419 Clinical Coagulation (4) *McDonnell* Lecture and laboratory coverage of the theory of the hemostatic system, to include tests used in the diagnosis/monitoring of patients with abnormal bleeding and/or thrombosis. Instrumentation as appropriate for testing included. Quality control and quality assurance discussed. Offered: S.

LAB M 420 Laboratory Analysis of Urine and Body Fluids (3) *Wilcock* Lecture and laboratory covering urinalysis testing procedures and associated disease entities. Analysis of other body fluids. Methods of microscopic examination by use of bright-field, phase, and polarizing microscopy. Offered: S.

LAB M 421 Medical Microbiology (1/6, max. 6) *Goodyear* Lecture and laboratory coverage of human infections and diagnostic procedures used for isolation, identification, and antimicrobial susceptibility testing of the microorganisms associated with disease. Offered: S.

LAB M 423 Clinical Chemistry (*-, max. 24) *Wilcock* Clinical testing using automated and manual methods. Measurement of pancreatic function and intestinal absorption, renal and liver function, enzymes, electrolytes, blood gases, lipids, toxicology, urinalysis, endocrinology, and immunology. Offered: AWSp.

LAB M 424 Clinical Microbiology (*-, max. 24) *Goodyear* Techniques used in the diagnostic microbiology laboratory, including quality control, specimen evaluation, identification of pathogenic microorganisms, and antimicrobial susceptibility testing. Offered: AWSp.

LAB M 425 Clinical Hematology (*-, max. 24) *McDonnell* Clinical study of techniques used in the diagnostic evaluation of blood cells, including production, proliferation, survival, morphologic, and functional features. Assessment of proteins and cells important in hemostasis included. Quality control and quality assurance issues considered. Biomolecular techniques appropriate for evaluation of the hematologic and hemostatic systems discussed. Offered: AWSp.

LAB M 426 Clinical Immunohematology (1-7, max. 7) *Nestor* Lecture and laboratory covering theory of transfusion medicine and serological procedures used in the evaluation of cellular

antigen systems. Principles of immunology and genetics included as appropriate for the techniques performed; screening of donor units to provide a safe product discussed. Quality control and quality assurance issues considered. Offered: W.

LAB M 427 Selected Studies in Laboratory Medicine (*, max. 24) *Lampe* Selected clinical study in the major scientific disciplines of laboratory medicine, to include molecular diagnostics, or pursuance of a clinical research study. Credit/no credit only. Offered: AWSpS.

LAB M 499 Undergraduate Research (*) Specific project in clinical laboratory investigation. Offered: AWSpS.

LAB M 502 Laboratory Medicine Grand Rounds (1, max. 6) *Fine* Grand rounds are concerned with current topics in the field of laboratory medicine. Credit/no credit only. Offered: AWSp.

LAB M 510 Laboratory Medicine Research Conference (1, max. 6) *Tait* Presentation and discussion of ongoing research and development projects by faculty, residents, fellows, and graduate students. Open to graduate students in laboratory medicine and other medical sciences. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

LAB M 520 Seminar in Organization and Management in Laboratory Medicine (3) *Chandler* Core course for the Master of Science degree in laboratory medicine. Prerequisite: graduate student standing in laboratory medicine or permission of instructor. Offered: odd years; Sp.

LAB M 521 Advanced Laboratory Hematology (1, max. 6) *Sabath* Lectures on diagnostic clinical hematology with emphasis on clinicopathological correlation. For laboratory medicine graduate students with special interest in diagnostic clinical hematology. Prerequisite: graduate standing and permission of instructor. Offered: AWSp.

LAB M 522 Hematopathology Seminar (2) *Wood* Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with PATH 522; even years; W.

LAB M 590 P-Research Projects in Laboratory Medicine (*) *Tait* Opportunity for laboratory experience on a research problem related to laboratory medicine. Students investigate areas of potential clinical importance. Projects selected from areas such as chemistry, coagulation, hematology, immunology, microbiology, virology, molecular diagnostics, and computer applications. Research goals established by instructor in discussion with student. Prerequisite: permission of instructor. Offered: AWSpS.

LAB M 601 Internship (3-9, max. 9) Credit/no credit only. Prerequisite: graduate standing in laboratory medicine. Offered: AWSpS.

LAB M 680 P-Clinical Laboratory Testing: Methods and Interpretation (*) *Wener* Provides the third- and fourth-year medical student with the opportunity to evaluate clinical laboratory data in the clinical laboratory setting. One-on-one teaching using case material and actual clinical samples. Offered: AWSpS.

LAB M 685 P-Laboratory Case Studies for Clinical Diagnosis (4) *Astion* Clinical case presentations and discussions aimed at test selection, disease-induced alterations, efficient algorithms, factors confounding interpretation, testing economics. Prerequisite: completion of required clerkships. (Four weeks half-time) Offered: A.

LAB M 699 P-WWAMI Laboratory Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

LAB M 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

MEDEX Northwest

MEDEX 450 Basic Science in Clinical Medicine for PAs (6) *Evans, Stoll* Intensive review course on important basic science concepts relevant to clinical medicine at the physician assistant level. Topics covered include cell biology, microbiology, genetics and immunity. Prerequisite: admission to the MEDEX Program. Offered: S.

MEDEX 451 Anatomy and Physiology for the MEDEX Practitioner (6) *Cauldwell, Landel* Anatomy and physiology of the following organ systems: HEENT, respiratory, cardiovascular, gastrointestinal, reproductive, renal, musculoskeletal, and neurologic. Required for entering students to the MEDEX program who have not satisfied program prerequisites in anatomy and physiology. Offered: S.

MEDEX 453 Basic Clinical Skills for the MEDEX Practitioner (5) *Cupp* Provides the student with mastery of a screening history and physical examination and thoroughness in data-collection skills. Branching examinations of major organ systems and medical record-keeping and verbal presentation skills by the problem-oriented method are taught. Offered: A.

MEDEX 454 Adult Medicine I (7) *Cupp, Evans* Problem-oriented approach to the diagnosis and management of common primary care conditions. Introduction to relevant laboratory and radiological procedures. Organ system approach. Offered: W.

MEDEX 456 Maternal and Child Health for the MEDEX Practitioner I (3) *Dale* Designed to acquaint students with principles of prenatal care and primary-care pediatrics. Offered: W.

MEDEX 457 Behavioral Medicine I (2) *Lurie* Process skills and interpersonal skills needed for primary-care practice, assessment skills needed for the diagnosis of emotional problems, and management skills used in primary-care practice to deal with these problems. Offered: A.

MEDEX 458 Behavioral Medicine II (2) *Lurie* In-depth coverage of common emotional problems seen in primary care. Offered: W.

MEDEX 459 Behavioral Medicine III (2) *Lurie* Continuation of MEDEX 458. In-depth approaches to assessment and management of specific primary-care problems. Advanced interviewing skills with videotaped feedback included. Offered: Sp.

MEDEX 460 Principles of Patient Management

for the MEDEX Practitioner I (3) *Stoll* Systematic approach to patient management applicable to a primary-care setting. Majority of course is devoted to drug therapy and its administration. The other half includes health maintenance, risk factor identification, and nonpharmacological models of therapy. Offered: W.

MEDEX 461 Principles of Patient Management for the MEDEX Practitioner II (3) *Stoll* Continuation of 460. Offered: Sp.

MEDEX 462 Maternal and Child Health for the MEDEX Practitioner II (3) *Dale* Continuation of 456. Emphasis on diagnosis and treatment of common pediatric problems. Offered: Sp.

MEDEX 463 Clinical Clerkships for the MEDEX Practitioner I (19) *Scott* Full-time clinical clerkship spent in institution-based or specialty practice settings, such as occupational health, surgery, emergency medicine, psychiatry, or geriatrics. Credit/no credit only. Offered: AWSpS.

MEDEX 465 Clinical Clerkships for the MEDEX Practitioner II (19) *Plummer* Continuation of clinical clerkships spent in institution-based or specialty practice settings, with emphasis on inpatient medicine. Credit/no credit only. Offered: AWSpS.

MEDEX 466 Family Practice Clerkship for the MEDEX Practitioner I (19) *Ballweg* Family practice under the supervision of physicians throughout the Pacific Northwest. Common primary-care problems. Students and preceptors are educated in the utilization and management of the physician assistant in practice. Students keep computerized records of patient encounters and complete a variety of written assignments. Credit/no credit only. Offered: AWSpS.

MEDEX 467 Family Practice Clerkship for the MEDEX Practitioner II (19) *Flynn* Further experience in primary-care practice with emphasis on independent patient management by the student supervised by family practitioners. Credit/no credit only. Offered: AWSpS.

MEDEX 468 Emergency Medicine I for the MEDEX Practitioner (2) *Landel* Approach to the diagnosis and management of common emergency conditions for primary care physician assistants. Organ system approach. Offered: W.

MEDEX 469 Emergency Medicine II for the MEDEX Practitioner (2) *Landel* Continuation of MEDEX 468. Approach to diagnosis and management of common emergency conditions for primary care physician assistant. Organ system approach. Offered: Sp.

MEDEX 470 PA Role Course I (1) *Ballweg* Introduction to the history, current status and future development of the PA profession. Description and discussion of state medical practice acts and reimbursement status. Other course topics are the roles of physicians and nurse practitioners. Offered: A.

MEDEX 471 PA Role Course II (1) *Ballweg* Continuation of MEDEX 470. Health access issues, health care politics and managed care issues. Offered: W.

MEDEX 472 PA Role Course III (1) *Ballweg* Continuation of MEDEX 471. Focuses on health care issues for specific underserved populations. Cross-cultural simulations introduce course

concepts. Students work in small groups and present their findings to fellow students. Offered: Sp.

MEDEX 473 Technical Skills I (1) *Coerver* Introduces clinical skills and procedures through hands-on experiences to physician assistant students Offered: A.

MEDEX 474 Technical Skills II (1) *Coerver* Introduces clinical skills and procedures through hands-on experiences to physician assistant students. Continuation of Technical Skills I. Offered: W.

MEDEX 475 Technical Skills III (1) *Coerver* Introduces clinical skills and procedures through hands-on experiences to physician assistant students. Continuation of Technical Skills II. Offered: Sp.

MEDEX 499 Special Field Projects/Independent Study (1-12, max. 12) Clinical clerkships and independent study activities for students enrolled in the MEDEX Northwest Physician Assistant Program. Credit/no credit only. Offered: AWSpS.

Medical Education and Biomedical Informatics

MEBI 499 Undergraduate Research (*, max. 12) Investigative research or directed readings in medical education and in biomedical and health informatics. Prerequisite: permission of instructor.

MEBI 510 Topics in Medical Education Research (1/3, max. 12) Selected research topics in medical education. Development of skills in critical analysis and production of original research. Optional: 1 additional credit for seminar focusing on application of issues in education practice. Credit/no credit only. Offered: AWSp.

MEBI 511 Current Issues in Medical Education (2) *Dohner, Robins, Scott, Wolf* Addresses current issues in medical education in the context of historic and contemporary developments. Topics include curriculum development, teaching, and learning, clinical knowledge and reasoning, assessment, professional development, program evaluation, and certification. Offered: A.

MEBI 512 Leadership in Academic Medicine (1) *Dohner, Robins, Scott, Wolf* Explores the theoretical and practical aspects of leadership in academic medicine. Topics include qualities of effective leadership, leadership styles, and impact of institutional organization and culture on leadership. Prerequisite: permission of instructor. Offered: S.

MEBI 520 Teaching Methods in Medical Education (2) *Ambrozy* Empirical and theoretical merits of different teaching methods as applied to medical education. Structuring and leading group discussions, using questions, organizing and delivering lectures, identifying styles of clinical supervision, providing constructive feedback, and presenting effective clinical demonstrations. Offered: W.

MEBI 521 Evaluation of Learning in the Health Sciences (3) *Carlina* Basic issues and methods for evaluation of learning: cognitive performance, psychomotor skills, and reasoning abilities in classroom, laboratory, and clinical settings. Practical applications of instruments such as

multiple-choice questions, essays, oral examinations, checklists, rating scales, simulations, and patient management problems. Recommended: 520. Offered: Sp.

MEBI 522 Research in Medical Education (2) *Scott* Individualized, problem-based overviews of research methods and research design pertinent to research and scholarship in medical education. Development and sequencing of research projects from conceptualization through literature review, including proposal development, project implementation, data management, analysis, and write-up. Assessment and critical reading of related literature stressed. Offered: A.

MEBI 530 Medical Informatics (3) *Masuda* Overview of biomedical and health informatics concepts, theories, and applications, including the historical evolution and the current and future research directions within the context of information flow in health care settings. Offered: A.

MEBI 532 Computing Concepts for Medical Informatics II (3) *Kalet* Continuation of topics begun in MEBI 531: multiprogramming and operating system principles, client-server, network programming with sockets, macros, higher level languages, software engineering. Prerequisite: MEBI 531 or equivalent. Offered: W.

MEBI 534 Biology and Informaticists (3) *Brinkley* A computing and information oriented treatment of the core concepts of human biology, addressing structure and function at three levels or organization: organism, cell, and gene. Each level includes examples of key anatomic and physiologic concepts, presented from a computational perspective and with the use of electronic resources. Offered: A.

MEBI 535 Clinical Topics for Informaticists (3) *Karras* Builds on Biology for Informaticists and introduces the student to a variety of clinical disciplines, representative clinical problems from these disciplines, and informatics issues and applications within these disciplines. Lecturers include faculty from the Schools of Medicine, Nursing, Pharmacy, and Dentistry. Prerequisite: MEBI 530, MEBI 531, MEBI 534. Offered: W.

MEBI 536 Bioinformatics and Gene Sequence Analysis (3) *Rose* Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with PABIO 536; W.

MEBI 537 Informatics Research and Evaluation Methods (4) *Carlina, Brock* Introduces the many facets of evaluation and research for Biomedical and Health Informatics projects. Focuses on formal studies of the application of information technology in medicine, conducted while an information resource is under development and after the resource is in routine service. Offered: W.

MEBI 540 Critically Appraising and Applying Evidence in Health Care (3) *Wolf* Literature appraisal skills for various articles (therapy effectiveness, diagnostic tests, literature reviews, clinical measurement, prognosis, quality of care, decision analysis, causation/etiology, guidelines, and economic evaluation). Appraisal of clinical information from literature, strengths/weaknesses

of data, analyses, study design/applicability to a current patient's problem. Prerequisite: permission of instructor. Offered: jointly with HSERV 528; W.

MEBI 541 Introduction to Systematic Reviews and Meta-analysis of Evidence (2) *Wolf* Conceptual understanding of the quantitative methods used to synthesize evidence. Methods for pooling evidence across independent studies, pooling binary/continuous outcomes, differences between fixed and random effects models, and guidelines for appraising published systematic reviews/meta-analyses. Prerequisite: introductory level courses in statistics, epidemiology or biostatistics. Prerequisite: permission of instructor. Offered: jointly with HSERV 529; Sp.

MEBI 550 Knowledge Representation and Applications (3) A readings class in knowledge representation, as described in the primary artificial intelligence and biomedical informatics literature. Topics may include: frame-based systems, description logics, theorem proving, complexity vs. tractability, ontologies, rule-based systems, and biomedical domain applications. Prerequisite: any artificial intelligence course (e.g., CSE 415 or better), or permission of instructor.

MEBI 552 Clinical Decision Support (3) *Doctor* Provides foundation in clinical decision making and support (including decision analysis, Bayesian analysis, belief networks, artificial intelligence, neural networks) presented in the context of local and national decision support systems and the movement to decrease errors in healthcare. Prerequisite: MED 530, MED 531, MED 535, MED 537, CSE 415 or permission of instructor. Offered: A.

MEBI 570 Health Sciences Information Needs, Resources, and Environment (3) Characteristics of users of health sciences information; health professionals, researchers, consumers and patients; environments (academic health sciences centers, hospitals, clinics, and public libraries); evaluation of information resources in health care; types and uses of health information management systems; policy issues, professional standards, education, and certification. Offered: jointly with LIS 528.

MEBI 580 Computing Fundamentals for Health Providers (3) Enables health professionals to solve work/practice challenges using existing features of desktop computers. Emphasizes productivity concepts. Introduces extended features of common software packages, as well as basic concepts/methods of small system management and support. Prerequisite: admission to Health Informatics Certificate Program or by instructor permission. Offered: jointly with NURS 521;W.

MEBI 590 Selected Topics in Health Informatics (1-3, max. 12) Computers and information technology are improving and changing healthcare education, research, and clinical practice. Informatics faculty and researchers from the UW and affiliated institutions present their research findings as well as discuss their views of national developments in their respective disciplines. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

MEBI 591 Biomedical Health Informatics Research Colloquium (1) Provides forum for extensive interactive research discussions. Format is round table with short presentations and long facilitated discussion amongst students

and core BHI faculty. Both students and faculty present. Topics primarily research focused (ongoing and proposed research.), but also journal articles, current topics of debate, and other. Credit/no credit only.

MEBI 598 Special Topics in Biomedical and Health Informatics (1-4, max. 12) Readings, lectures, and discussions pertaining to a significant biomedical and health informatics problem or an emerging issue. Topics vary. Offered: AWP/SpS.

MEBI 599 Independent Study or Research (*, max. 12) .

MEBI 600 Independent Study/Research (1-10, max. 10) Individual readings or study, including independent study in preparation for doctoral examinations, research, etc. Prerequisite: permission of instructor.

MEBI 700 Master's Thesis (1-15, max. 15) Prerequisite: permission of instructor. Offered: AWP/SpS.

MEBI 800 Doctoral Dissertation (1-10, max. 10).

Medical History and Ethics

MHE 401 History of Modern Medicine (3) I&S *Whorton* Survey of evolution of medical theory, practice, and institutions in European and American society from the late 18th century present. Medical background not required. Recommended: prior courses in sciences and/or history.

MHE 402 Ethical Theory (5) I&S *Jecker* Reviews the principal theories for normative ethical discourse, such as utilitarianism and deontology, and major metaethical commentary on those theories. Illustrated by classical and modern authors. Recommended: one basic course in ethics.

MHE 404 Metaethical Theory (5) I&S *Jecker* Study of major ethical writings in the twentieth century, with principal emphasis on the Anglo-American tradition. Recommended: one introductory philosophy course.

MHE 411 Introduction to Bioethics (3) I&S Basic concepts, principles, and methods of analysis, with application to some major issues in the field of bioethics. Case studies utilized to illustrate nature of questions arising in bioethics and to provide students with opportunity to develop skills in ethical analysis.

MHE 413 History of Alternative Healing (3) I&S *Whorton* Analysis of historical development of alternative healing in American society over last two centuries. Emphasis on evolution of theory, practice, and professional institutions for major alternative systems and interactions of alternative modalities with conventional medicine. Medical background not required.

MHE 417 Disease in History (3) I&S *Whorton* Study of Western civilization's experience with epidemic disease, the growth of understanding of the causes of disease, the formation of a philosophy of prevention, and the development of programs to protect the public health. Emphasis on the last two centuries. Medical background not required.

MHE 440 Philosophy of Medicine (5) I&S *Jecker* Familiarizes students with central issues

in the philosophy of medicine. Focuses on the nature of medical knowledge, the connection between theory and observation, the meaning of medical concepts, and the relationship between theories and the world. Recommended: prior courses in philosophy, history of science, or history of medicine. Offered: jointly with PHIL 459.

MHE 474 Justice in Health Care (5) I&S/VLPA *Jecker* Examination of the ethical problem of allocating scarce medical resources. Emphasis on fundamental principles of justice that support alternative health policies. Recommended: prior courses in philosophy or medical ethics. Offered: jointly with PHIL 411.

MHE 481 The Pursuit of Health in American Society (3) I&S *Berryman, Whorton* Examination of the development of concern for personal health over the past two centuries, and of the evolution of philosophies and practices of health promotion. Emphasis on the influence of both medicine and popular culture on shaping of attitudes toward diet, exercise, dress, sex, and other health behavior.

MHE 483 The Rise and Development of Sports Medicine (3) I&S *Berryman* Evolution of medical thought related to exercise for good health, training for sport participation, and treatment of sport-related injuries. Begins with ancient period, concludes with present. Development of specialization in sports medicine, sport team physicians, preventive medicine, concepts of fitness and wellness as related to exercise prescription, and sports medicine clinics.

MHE 485 Concepts of the Body in Nineteenth- and Twentieth-Century America (3) I&S *Berryman* Investigation of ideas relating to corporeal self in nineteenth- and twentieth-century America. Evolution of physical ideals of manliness/femininity, how ideals related to surrounding culture, how different bodily activities developed to realize ideals. Athleticism, physiognomy, beauty contests, body building, decorations, cosmetics, anthropometry, artificial parts.

MHE 497 Medical History and Ethics Special Electives (*-) .

MHE 498 Undergraduate Thesis (*) .

MHE 499 Undergraduate Research (*, max. 5) Investigative work in biomedical ethics or history of the biomedical sciences.

MHE 501 Alternative Approaches to Healing (2) *Whorton* Philosophies and practices of the major alternative approaches to healing. Historical characterization of alternative medicine accompanied by presentations by practitioners of chiropractic, naturopathic, homeopathic, and traditional Chinese medicine. Credit/no credit only.

MHE 503 The Historical Background of Modern Medicine (1) *Whorton* Major elements of thought, practice, and values that have directed the evolution of medicine in Western civilization. Medical culture examined as both an expression and modifier of the culture of its ambient society. Limited to: medical students and others in health professional schools. Credit/no credit only.

MHE 505 Professional Seminar I (3) Methods for identifying a bioethics research question and developing a systematic approach to investigat-

ing it, including utilization of bibliographic sources in bioethics, philosophy, history. Prerequisite: permission of instructor.

MHE 506 Professional Seminar II (2) Capstone course for M.A. in Bioethics. Includes conducting research in ethics, writing, giving oral presentations, facilitating seminars, developing curriculum vitae, and career planning.

MHE 511 P-Medical Ethics (2) Ethics course designed especially for first- and second-year medical students. Study of ethical problems arising in clinical setting of medicine, introducing students to philosophical analysis and argument in practical contexts. Seminar-discussion format with readings from contemporary authors. Credit/no credit only.

MHE 512 P-The Human Face of Medicine (2) Foundation of human values undergirding medical practice. Images of physician — motivations for medicine, empathy *versus* detachment in doctor-patient relationship, health for the health-professional — the art of coping, limits of power — when medicine fails to cure, uses/abuses of technology, physician's role in public health issues, the healing process.

MHE 513 P-Ethical Responsibilities of Medical Practice (2) Provides intensive and practical guidance about management of principal ethical and legal problems that arise in clinical practice: informed consent, confidentiality, decisions regarding life-support, advance directives and surrogate decision-makers, duty to care for indigent and risky patients. Offered: one-week intensive; S.

MHE 514 Legal, Ethical, and Social Issues in Public Health Genetics (3) *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with LAW H 504/PHG 512.

MHE 515 Public Commentary on Ethical Issues in Health Genetics (3) Explores issues in public health genetics through academic commentary, personal narratives, science fiction, and film using ethical frameworks from narrative ethics, feminist ethics, and principlism. Includes cloning, assisted reproduction, prenatal genetic testing presymptomatic genetic testing, gene therapies, scientific responsibility, and GMOs. Graduate students only. Offered: jointly with PHG 525.

MHE 516 Ethical Frameworks for Public Health Genetics (2) *Mastroianni* Case-based application of ethical principles in genetic medicine to range of problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: MHE 514/PHG 512. Offered: jointly with PHG 522.

MHE 517 Preclinical Hospice Volunteer Training Elective (3) *Farber, McCormick* Using lectures, small groups, role play, and readings, covers the basic knowledge, skills and attitudes that need to be mastered as a hospice volunteer. Students participate as hospice volunteers as part of their field experience. Offered: jointly with FAMED 546; W/Sp.

MHE 518 Spirituality in Medicine (2) *Farber, McCormick* Examination of the beliefs, values, meaning, and spirituality of health professionals for the well-being of their patients as well as for themselves. Offered: jointly with FAMED 547.

MHE 520 Seminar in the History and Philosophy of Medicine (3) Origins and philosophical foundations of medical sciences. Critical analysis of processes of evaluation and explanation in biomedical sciences. Consideration of evolution and nature of modern biomedical investigation; concepts of life/death, health/disease; philosophical dimensions of clinical medicine. Open to majors, medical students, arts and sciences graduate students, and others.

MHE 521 The Ethical Challenges of Modern Medicine (3) *McCormick* Case-study approach to contemporary ethical issues in medicine, utilizing techniques of ethical analysis and argument in examining actual cases arising in our pluralistic culture, where values are often in conflict. Open to graduate and professional students and others with appropriate background.

MHE 522 Ethical Problems Surrounding Death (3) *McCormick* Issues arising in care and treatment of dying patients and their families, including truthful disclosure, use of life-supports, "euthanasia," coping with death and grief. Intersection of patient and professional values related to care in terminal phase of illness. Open to graduate and professional students and others with appropriate background.

MHE 523 Biomedical Ethics (3) *McCormick* Selected topics in medical ethics emphasizing methods of ethical reasoning about moral dilemmas and contributions of philosophical theories and principles to practical problems of medicine. Students provided with opportunities to test their value assumptions and analytical skills. Open to graduate and professional students and others with appropriate background.

MHE 530 Genetic Discovery in Medicine and Public Health (3) *Burke* Addresses the clinical and societal implications of genetic knowledge, with an emphasis on the ethical and policy issues surrounding the use of genetic technology in medicine and public health from 1900 to the present. Offered: jointly with PHG 542; W.

MHE 535 Medical Ethics and Jurisprudence (3) *Jonsen* Relationship between bioethics and law. Review of basic concepts of both disciplines; their theoretical and practical connections. Analysis of principal legal cases and statutes illustrating such issues as informed consent to treatment, foregoing life support, research with human subjects, confidentiality, allocation of health care resources. For graduate and professional students.

MHE 536 Research Ethics and Regulation (3) *Mastroianni* Explores the ethical principles and concepts and U.S. laws related to (1) research conducted with animals, (2) research on humans, and (3) the responsible conduct of research. Required for graduate students in the Department of Medical History and Ethics, School of Medicine. Offered: jointly with LAW H 536; W.

MHE 540 Seminar in the History of Health and Physical Exercise (3) Selected topics in the development of medical thought as it relates to exercise, sport, and overall well-being. Open to majors and graduate students in medicine, the

arts and sciences, and others with appropriate background and interest. Prerequisite: permission of instructor.

MHE 541 Exercise in Modern Medicine (1) *Berryman* Survey of role and place of exercise in modern medicine. Historical and contemporary analysis of physical activity and sports medicine in the American health system. Presentations by clinicians about their experiences in: orthopaedics, exercise physiology, sports nutrition, sports psychology, pediatric sports medicine, special issues of female athletes, environmental medicine.

MHE 542 Legal and Ethical Issues in Advanced Practice Nursing (3) *Shannon* Reviews selected ethical issues in health care and legal guidelines relevant to health care decision-making. Explores bioethics as a type of applied ethics. Focuses on preparing students for ethical challenges in advanced nursing roles. Offered: jointly with NURS 522; Sp.

MHE 548 Introduction to Clinical Ethics (5) *Burke* Introduction to history, practice, and research methods in clinical ethics. Case-based examination of methods including principlism, casuistry, narrative methods, virtue ethics. Prerequisite: permission of instructor.

MHE 549 Current Topics in Clinical Ethics I (3) *Dudzinski* Analysis of complex ethical cases from UWSOM clinical departments, literature, and media. Case discussion focuses on implications for delivery of medical care. Prerequisite: MHE 548 or permission of instructor.

MHE 550 Current Topics in Clinical Ethics II (3) *Fryer-Edwards* Analysis of complex ethical cases from UWSOM clinical departments, literature, and media. Case discussion focuses on public policy implications. Prerequisite: MHE 548 or permission of instructor.

MHE 595 Ethics Practicum (1-6, max. 6) Students participate in clinical ethics rounds, case discussions, review of research protocols, or other professional activities related to bioethics. Credit/no credit only. Prerequisite: by permission of instructor.

MHE 596 Masters Research Project ([1-12]-, max. 12) Research project culminating in a scholarly paper suitable for publication in a peer-reviewed journal. Credit/no credit only. Majors only.

MHE 597 Special Topics in Medical Ethics (1-, max 15) Various special topics in medical ethics. Offered: AWSpS.

MHE 600 Independent Study or Research (*).

Medicine

MED 498 Undergraduate Thesis (*) *Paauw* Offered: AWSpS.

MED 499 Undergraduate Research (*) *Paauw* Case studies, with laboratory research. Available to undergraduates and medical students. Offered: AWSpS.

MED 505 P-Preceptorship in Medicine (1) *Paauw* To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations by being stationed with carefully selected clinical faculty members in their offices. Credit/no credit

only. Prerequisite: permission of department. Offered: AWSpS.

MED 510 Health Issues of Sexual Minorities (1) *Greenberg* Introduction to the special health care issues and barriers confronting persons identified as bisexual, gay, lesbian, or transgendered. Includes lectures, panels, and case presentations by faculty and community experts. Offered: Sp.

MED 530 AIDS: A Multidisciplinary Approach (2) *Hawes* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of (HIV) infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Credit/no credit only. Offered: jointly with EPI 530; A.

MED 531 P-Human Genetics (*) *Stamatoyannopoulos* Weekly seminar dealing with a variety of topics in medical genetics given by faculty of the Division of Medical Genetics and related departments and divisions. Open to medical students with a good foundation in genetics. Offered: AWSp.

MED 532 Statistical Methods in Medical Genetics (2) *Wijsman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications stressed with reference to assumptions and limitations. Data sets analyzed with current computer programs. Prerequisite: knowledge of genetics or permission of instructor. Offered: jointly with BIOST/PHG 532; Sp.

MED 533 P-Clinical Endocrinology (2) *Cummings* Emphasis on the most major and dependable symptoms, signs, laboratory tests, and therapy for clinical endocrinopathies. Patient illustrated. Limited to second-year medical students. Offered: W.

MED 546 Clinical Applications of Gene Therapy (2) *Lieber* Overview of the current status of gene therapy. Discusses its role in the future practice of medicine. Lecture and literature reviews. Offered: S.

MED 547 Quantitative Methods in Medical Genetics (2) Computational methods of use for medical genetics. Review of problem sets. Topics range from basic probability to linkage analysis. Prerequisite: genetics and permission of instructor.

MED 549 Clinical Medical Genetics (1) Review of current clinical advances in medical genetics. Includes lectures and discussion of cases from medical genetics clinic. Prerequisite: genetics or human genetics and permission of instructor. Offered: AWSp.

MED 550 P-An Introduction to Emergency Medicine (1) *Mengert* Presentation of common medical and surgical emergencies and their urgent management, especially within the framework of rapid patient assessment and stabilization. Lecture topics include chest pain and myocardial infarction, basic arrhythmia management, and burn and wound care. Offered: Sp.

CONJ 550 P-Clinical Infectious Diseases (3) *Spach* See Conjoint Courses.

MED 555 P-Mind, Body, and Pen: Writing and the Art of Becoming a Physician (1) Provides forum for medical students to write about issues in medicine and medical education. Focuses on writing as a process for giving voice to the conflicting demands and dilemmas of becoming a physician. Explores personal narratives, dreams and disappointments, chronic illness and death, empathy and revulsion, authenticity and power. Offered: W.

UCONJ 555 Principles of STD/HIV Research (3) *Lukehart* See University Conjoint Courses.

MED 560 P-Advanced Global Health (2) *Kimball* Prepares health profession students for work in developing countries. Includes health care delivery systems, political, social, and economic determinants of health, major global health issues, and personal well-being while abroad. Lecture and seminar format with guest speakers, student presentations, and discussion. Offered: Sp.

MED 561 Tropical Medicine (1) Intended for professional health science students interested in learning the pathophysiology, epidemiology, and clinical presentation of disease conditions that are more commonly seen in less-developed countries, resource-limited settings, or tropical climates, and how to diagnose, treat, and follow the resolution of these diseases with commonly limited resources. Credit/no credit only.

MED 565 P-The Healer's Art: Awakening the Heart of Medicine (1) *Wicks* Encourages cultivation of human dimensions in practice of medicine while strengthening personal commitment to medicine as a life's work. Facilitates student recognition of commonality of personal concerns among peers and student response to the dimension of mystery in the experience of illness as well as development the capacity for awe. Offered: W.

MED 599 P-Transfusion Machine (3) *Reiner* Group discussions and didactic sessions cover broad category of transfusion medicine. Hands-on laboratory experience in red cell serology/compatibility, coagulation, and histocompatibility with emphasis on diagnosis and management of clinical problems. Based at Puget Sound Blood Center. Prerequisite: fourth-year medical student standing; third-year student standing with permission of instructor.

MED 604 P-Clinical Preceptorship in Internal Medicine (8) *Shima (Forks)* Working closely with primary-care physicians, the student is exposed to the private practice of internal medicine in a small community. Operating on a one-to-one basis with an internist, the student evaluates and manages inpatients and outpatients on a primary care, consultative, and emergency basis. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWSpS.

MED 630 P-WRITE Medicine Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

MED 640 P-Dermatology Clinic (*, max. 5) *Olerud* Students attend dermatology clinic on Monday mornings and Thursday afternoons for twelve weeks. Two half-days per week. Prerequisite: MED 665. Offered: AWSpS.

MED 642 P-Clinical Oncology (8) *Stewart (Fred Hutchinson Cancer Research Center)* Students functioning as primary physicians are responsible for the workups and daily care of patients receiving marrow transplants, high-dose chemotherapy or immunotherapy on an intensive-care research ward. Emphasis is on the management and supportive care of patients with pancytopenia and immunosuppression, transplantation biology, cancer chemotherapy, and infectious disease problems. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 644 P-Management of Sexually Transmitted Diseases (2) *Golden, Handsfield* Instruction and clinical experience in diagnosis, treatment, management, and patient counseling of sexually transmitted diseases. Instruction in genitourinary physical examination skills; relevant laboratory techniques and management of patients with STDs. Prior to the elective, each student must review a packet of didactic materials. Prerequisite: MED 665, SURG 665, and OB GYN 665. Offered: AWSpS.

MED 650 P-Advanced Medical Genetics (*, max. 5) *Jarvik, Horwitz, Stamatoyannopoulos* Summer course intended for third-year students who would like to increase their background in specific areas of medical genetics. Involves seeing patients with the instructor, reviewing the literature, analyzing clinical information, and writing a review on a selected topic. Prerequisite: HUBIO 554. Offered: S.

MED 655 P-Clinical HIV Care (8) *Harrington* Full-time outpatient and inpatient elective in HIV care for senior medical students. Students see patients for routine care and acute medical problems that do not require hospitalization, as well as provide inpatient consults. Prerequisite: MED 665.

MED 656 P-Clinical Nutrition (8) *Bruemmer, Purnell, Weigle* Instruction in nutritional assessment and care of both inpatients and outpatients. Students work with preceptors at a variety of hospital and clinic teaching sites, attend nutrition-related seminars, and practice interview skills on standardized patients. Prerequisite: HUBIO 568; MED 665.

MED 665 P-Clinical Clerkship (*, max. 24) *Paauw* Third-year medical students assume increasing responsibility for care of hospitalized patients in a teaching-hospital setting and participate in a four-week outpatient experience emphasizing continuity of care. Daily rounds with resident and attending physicians, with lectures and conferences. Progress evaluated by supervising physicians and a written examination. (Twelve weeks, full-time.) Offered: AWSpS.

MED 666 P-Advanced Clinical Clerkship in Internal Medicine-WWAMI (12) *Paauw* Advanced clinical clerkship in internal medicine in three small urban communities. Supervised, structured experience in dealing with situations commonly encountered by the practicing internist. Continuity of care and the relationship between care given in the ambulatory setting and in the hospital, as well as by other community health services, is emphasized. Prerequisite: MED 665. (Six weeks, full time. Limit: six students.) Offered: AWSpS.

CONJ 677 P-Clinical Allergy and Immunology (*, max. 12) *Henderson* See Conjoint Courses.

MED 678 P-Clinical Dermatology (8) *Olerud* Participation in dermatology clinics and inpatient

consultations at University of Washington Medical Center; Harborview Medical Center; Children's Hospital Medical Center; Seattle V.A. Hospital; Meridian, Idaho; Casper, Wyoming; and Bellingham, Washington. Journal club and clinical conferences each week with entire staff. A continuing series of teaching seminars and weekly dermatopathology conferences. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 679 P-Clinical Gastroenterology (8) *Lee, Novan (Sacred Heart Spokane)* Participation in consulting ward rounds, procedures, conferences, and selected clinics with full-time divisional staff at University and Veterans Administration hospitals, and at Pacific and Harborview medical centers, plus directed tutorial work. Prerequisite: MED 665. (Four weeks, full-time.) Offered: AWSpS.

MED 680 P-Rheumatology (8) *Elkon* Full-time inpatient-outpatient clerkship in rheumatology. Clinical experience provided in diagnosis and treatment of rheumatic diseases, utilizing outpatient clinics and hospitalized patients at the University of Washington Medical Center, Harborview Medical Center, or VAMC. Emphasis on concepts in pathophysiology, diagnosis, and treatment of these diseases. In addition to patient contact, reading, seminars, and preceptorial sessions are the methods of instruction. Prerequisite: MED 665. Offered: AWSp.

MED 681 P- Dermatologic Surgery (8) Dermatologic surgery elective for senior medical students. Instruction in Mohs surgery, conventional skin surgery, cosmetic procedures, wound healing and closure, and intraoperative and postoperative patient management. Prerequisite: MED 665.

MED 682 P-Clinical Cardiology and Electrocardiography (8) *Caldwell (Seattle V.A. Hospital), Corson (Harborview Medical Center), Herzog (Anchorage Veterans Administration Hospital), Mascette (Madigan Hospital Medical Center), Novan (Sacred Heart, Spokane), Otto (University of Washington Medical Center)* Clerkship in clinical cardiology-combined inpatient-outpatient assignments, ECG interpretation. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 683 P-Clinical Respiratory Disease and Critical Care Medicine (8) *Lakshminahrayan (Seattle V.A. Hospital), Pierson (Harborview Medical Center), Roth (Madigan) Thompson (Boise Veterans Administration Medical Center), Tonelli (University of Washington Medical Center)* Training in respiratory disease diagnosis and pulmonary therapy, with special emphasis on cardiopulmonary function testing and interpretation. Inpatient and outpatient teaching rounds, conferences, and basic science integration. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 684 P-Clinical Hematology/Oncology (8) *Abkowitz (University of Washington Medical Center), Broudy (Harborview Medical Center), Collins (Boise Veterans Administration Medical Center), Roth (Seattle V.A. Hospital), Zuckerman (Boise Veterans Administration Medical Center)* Outpatient and inpatient experience with hematologic/oncologic disorders. The elective includes teaching rounds, conferences, and evaluation of laboratory work. Prerequisite: MED 665. (Four weeks.) Offered: AWSpS.

MED 685 P-Clinical Genetics (*, max. 24) *Bird, Byers, Motulsky, Stamatoyanopoulos* Full-time clinical clerkship in medical genetics. Provides extensive exposure to variety of genetic diseases and genetic counseling. Students work in three clinics (Monday, Tuesday, Thursday), response to in-house consultation requests, attend rounds at Children's Hospital and Medical Center and University of Washington Medical Center and seminars at University of Washington Medical Center (Wednesday, Friday). Prerequisite: MED 665. Offered: AWPpS.

MED 686 Medical Consultation (8) *Hamlin* Full-time outpatient and inpatient elective in peri-operative medical consultation for senior medical students. Students see patients in the medical consultation clinic, then follow them daily when they come in for surgery. Prerequisite: MED 665. Offered: AWPpS.

MED 688 P-Ward Medicine Subinternship (*, max. 24) *Harvey (Anchorage), R. Jones (Madigan Hospital Medical Center), McGee (Veterans Administration Medical Center), Paauw (University of Washington Medical Center), Schoene (Providence), Sheffield (Harborview Medical Center)* Students act in the capacity of interns on the medical wards under supervision of house staff and visiting physicians. They attend all regular medicine rounds and conferences as their schedules permit. Prerequisite: MED 665. (Four or six weeks.) Offered: AWPpS.

MED 689 P-Clinical Infectious Diseases (8) *Stamm (University of Washington Medical Center)* Students participate in the consulting service throughout the hospital, attend daily plate rounds, conferences, and seminars. (Four weeks.) *Corey (Fred Hutchinson Cancer Research Center), Holmes (Harborview Medical Center), Miller (Seattle V.A. Hospital), Morris (Madigan Army Medical Center), Novan (Spokane), Stevens (Boise Veterans Administration Hospital).* Participate in consulting service throughout hospital to learn microbiological aspects of infectious diseases through the clinical laboratories. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 690 P-Cardiology Subinternship (8) *Otto (University of Washington Medical Center)* Students act in the capacity of interns on the cardiology service under the supervision of house officer. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 691 P-Primary Care (8/12) *Paauw* Six-week, full-time ambulatory care block in primary care internal medicine. Students participate in several clinics at University of Washington Medical Center following a panel of patients in medicine, rheumatology, and virology clinics. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

MED 692 P-Clinical Endocrinology and Metabolism (*, max. 12) *Weigle (Seattle-based program); Bunner (Madigan)* Clerkship in clinical endocrinology and metabolism combined inpatient and outpatient assignments at selected hospitals. Prerequisite: MED 665. Offered: AWPpS.

MED 693 P-Nephrology and Fluid Balance (8) *Couser (University of Washington Medical Center), Narasimhan (Boise Veterans Administration Hospital), Novan (Spokane Sacred Heart), Sherrard (Seattle V.A. Hospital), Zager*

(*Harborview Medical Center*) Students see clinical nephrologic problems under close supervision, participate in nephrology and transplant rounds, see consults with renal fellow and attending, and work up patients in renal clinics, participate in seminars with clerks from all three hospitals. Prerequisite: MED 665. (Four weeks.) Offered: AWPpS.

MED 694 P-Harborview Evening Clinic (2) *Assefi* A longitudinal elective for senior medical students who assume primary responsibility for a panel of medical patients in an outpatient clinic. Direct care of patients is supplemented by didactic sessions dealing with issues in ambulatory care. Students are strongly encouraged to participate for four quarters. Prerequisite: MED 665 and permission of instructor. Offered: AWPpS.

MED 695 P-Clinical Aspects of Aging (8) *Abrass, Hazzard (Harborview Long Term Care Service, Harborview Medical Center, and Seattle V.A. Medical Center), Cusak (Boise V.A. Medical Center)* Work with elderly patients as subintern with Senior Care Program. Inpatient and ambulatory setting in nursing homes and patients' homes. Interdisciplinary approach. Prerequisite: MED 665. Offered: AWPpS.

MED 697 P-Medicine Special Electives (*, max. 24) *Paauw* Special clerkship, externship, or research opportunities that can at times be made available at institutions other than University of Washington. Faculty can advise students of opportunities. Students wishing to elect this course should obtain from Dean's office a special assignment form at least three months before preregistration. Prerequisite: permission of department. (Two, four, six, or twelve weeks.) Offered: AWPpS.

MED 699 P-WWAMI Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Microbiology

MICROM 101 Microbes and Us (5) NW *Anderson, Brill* Intended for liberal arts majors and students not majoring in the biological sciences. Focuses on activities of bacteria, viruses, and other microorganisms, and their influence on humans. Microbe-related topics include disease, bioterrorism, food, biotechnology, and ecology. Examines the nature of scientific inquiry, along with major biological concepts. Offered: W.

MICROM 301 General Microbiology (3) NW *Anderson, Lara, Nester* Acquaints students with microorganisms and their activities. Topics include microbial cell structure and function, metabolism, microbial genetics, and the role of microorganisms in disease, immunity, and other selected applied areas. Prerequisite: either CHEM 120, CHEM 140, CHEM 142, or CHEM 145; recommended: biology; organic chemistry. Offered: AWPpS.

MICROM 302 General Microbiology Laboratory (2) NW *Anderson, Chandler, Gray* Laboratory course primarily for students taking 301. Covers a variety of microbiological techniques, with experiments designed to

illustrate major concepts of bacteriology, virology, and immunology. No auditors. Recommended: MICROM 301 which may be taken concurrently. Offered: AWPpS.

MICROM 322 Applied Clinical Microbiology (5) NW *Cookson*, Practical experience in a clinical or public health laboratory; fifteen hours per week. For students majoring in medical microbiology. Three quarters advance sign-up in G315 Health Sciences recommended. Applicants are selected by interview. Credit/no credit only. Prerequisite: MICROM 443.

MICROM 402 Fundamentals of General Microbiology Laboratory (3) NW *Fulton, Gray* Isolation of a broad range of nonpathogenic bacteria from natural sources, using selective and enrichment techniques, with microscopic, biochemical, and molecular identification. Related exercises include genetics, physiology, quantitation, and growth energetics. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410 which may be taken concurrently. Offered: AWPpS.

MICROM 410 Fundamentals of General Microbiology I (3) NW *Lara, Traxler* Survey of the microbial world, metabolism, biosynthesis, regulation, growth, structure, and function. Required for students majoring in microbiology; recommended for students majoring in biology. Prerequisite: either BIOL 200 or BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: A.

MICROM 411 Gene Action (5) NW *Gray, Libby, Manoil* Molecular genetics: description of fundamental genetic processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focuses on prokaryotic organisms. Prerequisite: either BIOL 200 or BIOL 201; either CHEM 223, CHEM 237, or CHEM 335. Offered: jointly with GENOME 411; W.

MICROM 412 Fundamentals of General Microbiology III (3) NW *Leigh* Structure, biochemical properties, and genetics of the major groups of prokaryotes. Prerequisite: either BIOL 200, BIOL 201, or BIOL 203; recommended: either CHEM 223, CHEM 237, or CHEM 335; MICROM 410. Offered: Sp.

MICROM 431 Prokaryotic Recombinant DNA Techniques (3) NW *Anderson, Chandler* Laboratory course emphasizing concepts and techniques/methodologies in recombinant DNA research employing bacteria and their viruses. Topics and experiments/demonstrations include genomic and plasmid DNA isolation, restriction mapping, cloning, transposon mutagenesis, sequencing, and Western and Southern blotting. No auditors. Prerequisite: either BIOL 200, BIOL 201, or MICROM 301. Offered: W.

MICROM 435 Microbial Ecology (3) NW *Staley* Consideration of the various roles that microorganisms, particularly bacteria and cyanobacteria, play in environmental processes. The interrelationships among microorganisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Prerequisite: either BIOL 180, BIOL 201, or BIOL 203. Offered: even years; Sp.

MICROM 440 Introductory Bacteriology for

Medical Technologists (1) NW Anderson
Limited introduction to basic microbiology, with focus on structure, metabolism, and genetics of medically important organisms. Open only to medical technology students. Credit/no credit only. Offered: A.

MICROM 441 Introduction to Immunology (4) NW General properties of immune responses; cells and tissues of immune system; lymphocyte activation and specificity; effector mechanisms; immunity to microbes; immunodeficiency and AIDS; autoimmune diseases; transplantation. Prerequisite: either BIOL 220 or BIOL 202; recommended: either GENET 371, GENET 372, BIOC 405, or BIOC 440. Offered: jointly with IMMUN 441; A.

MICROM 442 Medical Bacteriology (3) NW Cookson, Fulton Medically important bacterial pathogens are discussed in terms of the clinical, therapeutic, and epidemiological aspects of diseases caused by them, molecular mechanisms of pathogenesis and their identification in the clinical laboratory. Laboratory course 443 coordinates. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410; MICROM 441. Offered: W.

MICROM 443 Medical Microbiology Laboratory (3) NW Anderson, Chandler, Fulton Required for medical technology students, microbiology majors; elective for medical students. Procedures for isolation and identification of pathogenic bacteria, testing their susceptibility to antibiotics. No auditors. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410. Offered: AW.

MICROM 444 Medical Mycology and Parasitology (4) NW Anderson, Fulton, Schmer, White Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis. For medical technology students, microbiology majors, and medical students as an elective. Prerequisite: either BIOL 200 or BIOL 201; recommended: immunology. Offered: Sp.

MICROM 445 Medical Virology (2) NW Languoff An introductory course emphasizing basic understanding of medical virology and viral pathogenesis. The biochemical, replication, host-parasite relationships and pathogenesis of animal viruses are examined. Prerequisite: either BIOL 180, BIOL 200, or BIOL 201; Sp.

MICROM 447 Immunity, Disease and Society (2) Clark Impact and controversies associated with breakthroughs in immunology and infectious diseases. Topics include vaccines, complementary medicine (herbal boosts of the immune system), the mind and the immune system, allergies (asthma), cancer immuno-therapy, genetic screening and autoimmune disease and natural history of infectious disease. Prerequisite: MICROM 441. Offered: jointly with IMMUN 447.

MICROM 450 Molecular Biology of Viruses (3) NW Champoux Introduction to the molecular biology of viruses and virus-host relationships. Designed for advanced undergraduates and graduate students in the biological sciences. Coverage includes bacterial and animal viruses, with an emphasis on the molecular mechanisms of viral gene expression and regulation. Prerequisite: either BIOL 200 or BIOL 201; recommended: MICROM 410, MICROM 411, GENET 371, or GENET 372. Offered: W.

MICROM 482 Peer Teaching Assistants in Microbiology (1-5, max. 10) Direct experience in teaching a microbiology laboratory class. Peer TA's attend concurrent accompanying lecture course, meet weekly to coordinate, give introductory lab remarks, supervise the execution of lab exercises, and assist in preparing/grading of quizzes/exams. Training in teaching techniques, approaches. Student evaluation provided. CR/NC only. Prerequisite: MICROM 402 and MICROM 410. Offered: AWSpS.

MICROM 490 Aquatic Microbiology (3/5) NW Herwig Basic principles of aquatic microbiology and aquatic microbial ecology: role and identity of aquatic microorganisms; introduction to modern methodologies for research. Laboratory work with local freshwater and marine samples for those enrolled in the five-credit section. Recommended: 15 credits of biological science, 10 credits of chemistry. Offered: jointly with FISH 490; Sp, odd years.

MICROM 495 Honors Undergraduate Research (*-) Leigh Specific problems in microbiology or immunology. Offered: AWSpS.

MICROM 496 Undergraduate Library Research (2) An introduction to library research techniques and to microbiological literature. Staff assign a topic and supervise the project. Offered: AWSpS.

MICROM 499 Undergraduate Laboratory Research (*-) Leigh Specific problems in microbiology or immunology. Credit/no credit only. Offered: AWSpS.

MICROM 500 Introduction to Research (*, max. 20) Introduction to research areas of the faculty and the techniques employed in their investigations. Credit/no credit only. Prerequisite: graduate standing in microbiology or permission of instructor. Offered: AWSpS.

MICROM 510 Physiology of Bacteria (3) Traxler Topics of current interest concerning the molecular biology and physiology of bacteria. Prerequisite: MICROM 410 and BIOC 440, 441, and 442, or permission of instructor. Offered: odd years; W.

MICROM 518 Bioremediation of Environmental Pollutants (3) Herwig, Strand Detailed survey of current understanding of biological pathways for transformation and degradation of toxic organic compounds, pesticides, oil, and metals. Microbial and plant transformations of pollutants and requirements for bioremediation. Requires basic understanding of metabolism and organic chemistry. Prerequisite: biological science course. Offered: jointly with CEE 542/ESC 518; W.

MICROM 520 Seminar (1) Leigh Credit/no credit only. Offered: AWSp.

MICROM 522 Current Research in Microbiology (1) Champoux Weekly student and faculty seminar presentations based on the current literature. Credit/no credit only. Prerequisite: graduate standing in microbiology. Offered: AWSp.

MICROM 525 Cell Surface Membrane in Cell Sociology and Immunology (2) Carter, Hakomori Structure and function of cell surface membranes in relation to development of various diseases, particularly infection, cancer, and inflammation. Examines how specific cell surface molecules are targets of recognition by microbes, tumor cells, and recruited inflammatory cells. Prerequisite: BIOC 440, BIOC 441, BIOC 442,

and permission of instructor. Offered: jointly with PABIO 525.

MICROM 526 Research of Cell Surface Problems (1) Traxler Weekly research seminar and discussion of scientific literature pertaining to the process of membrane protein biogenesis. Credit/no credit only. Prerequisite: permission of instructor.

MICROM 527 Genetic Approach to Complex Biological Processes (1) Current research as it applies to genetic approaches to complex biological processes in the area of microbiology.

MICROM 528 Salmonella Genetics (1) Review current literature in the area of gene regulation in *Salmonella typhimurium* and related studies in *Escherichia coli*. Prerequisite: graduate student standing; advanced undergraduates by permission of instructor.

MICROM 529 Mechanisms of Bacterial Pathogenesis (1) Fang Student and faculty seminar presentations based on current research pertaining to mechanisms of bacterial pathogenesis at the molecular and cellular levels. Credit/no credit only. Prerequisite: graduate standing in microbiology. Offered: AWSp.

MICROM 530 Evolution of Prokaryotic Diversity (3) Leigh Evolution, diversity, and genomics of prokaryotic microorganisms. Lectures, discussions, and reading of current literature. Open to graduate students in the biological sciences and advanced undergraduates with permission of instructor. Offered: even years; W.

MICROM 531 Prokaryotic Diversity and Evolution Laboratory (2) Leigh Enrichment, isolation, and molecular phylogenetic characterization of selected prokaryotic organisms. Prerequisite: permission of instructor. Offered: even years; W.

MICROM 532 Seminar in General Microbiology (1, max. 15) Leigh Weekly seminar concerning research topics in the genetics and biochemistry of selected bacteria. Credit/no credit only. Prerequisite: MICROM 410, permission of instructor. Offered: AWSpS.

MICROM 533 Herpesvirus Research Meeting (1) Languoff Weekly research seminar and discussion of scientific literature pertaining to the study of molecular virology of Kaposi's Sarcoma-associated herpesvirus. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MICROM 534 Research Seminar in Salmonella Pathogenesis (1) Fang Provides a formal group setting for discussion and evaluation of a student's research progress. Credit/no credit only. Offered: AWSpS.

MICROM 540 Virology (3) Katze Lecture-seminar course concerning host-viral interactions. Prerequisite: permission of instructor. Offered: even years; W.

MICROM 553 Molecular Mechanisms of Bacterial Pathogenesis (3) Collins Mechanisms of bacterial pathogenesis explored at the molecular, genetic, and cellular levels through selected models as presented in the current scientific literature. Prerequisite: MICROM 411 or equivalent. Offered: odd years; A.

MICROM 554 Seminar in Molecular and Medical Microbiology (1, max. 15) Collins,

Cookson Weekly one-hour seminar in which recent advances in molecular biology of microbial pathogenesis or the current research of the participants is presented and discussed critically. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPp.

MICROM 555 Advanced Clinical Microbiology (2.5) *Limaye* Attendance at daily plate rounds of the Division of Clinical Microbiology. Designed to increase understanding of clinical microbiological work and its application to the care of the patient. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor. Offered: AWPp.

MICROM 556 Clinical Microbiology Training and Research (*, max. 12) Training in clinical microbiology and applied research. Attendance at daily laboratory rounds in addition to benchside training and research. For medical students and microbiology graduate students only. Credit/no credit only. Prerequisite: MICROM 443 and permission of instructor.

MICROM 560 Research and Journal Club in Retrovirology (1) *Linial* Weekly research seminar and discussion of literature in areas of retroviral replication and transformation. Prerequisite: graduate or permission of instructor. Offered: AWPp.

MICROM 562 Oncogene and Retrovirus Research Seminar (1) *Linial, Overbaugh* Weekly discussions of ongoing research related to retroviral replication, retroviral oncogeneses and pathology. Prerequisite: graduate standing or permission of instructor. Offered: AWPp.

MICROM 563 Research Seminar in Mycobacterial Pathogenesis (1) *Ramakrishnan*. Discussion of research topics in the study of the pathogenesis of tuberculosis and the microbial and host factors contributing to this complex infection. Credit/no credit only. Offered: AWPp.

MICROM 585 Research in Cell and Molecular Biology (1, max. 15) *Champoux* Weekly research seminar. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPp.

MICROM 588 Research in Applied Microbiology (1) *Lidstrom* Weekly research seminar and discussion of scientific literature pertaining to applied microbiology. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with CHEM E 588; AWPp.

MICROM 599 Research Presentations (2) Current research review. Credit/no credit only.

MICROM 600 Independent Study or Research (*) Credit/no credit only. Offered: AWPp.

MICROM 700 Master's Thesis (*) Credit/no credit only.

MICROM 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWPp.

Neurological Surgery

NEUR S 498 Undergraduate Thesis (*) *Avellino, Bobola, D'Ambrosio, Ellenbogen, Horner, Moroud, Morrison, Rostomily, Silber* Offered: AWPp.

NEUR S 499 Undergraduate Research (*) *Avellino, Bobola, D'Ambrosio, Ellenbogen, Horner, Moroud, Morrison, Rostomily, Silber* Investigation of special problems as an intimate

member of the research team in the neurological surgery laboratories. Research to lead to a thesis, if desired. List of projects available on request. Prerequisite: permission of instructor. Offered: AWPp.

NEUR S 505 P-Preceptorship in Academic Neurosurgery (1) *Avellino, Britz, Ellenbogen, Goodkin, Kliot, J. Ojemann, Rostomily, Sekar, Silbergeld* Opportunity for first- and second-year medical students to observe the research, teaching, and patient-care activities of academic neurosurgery. Prerequisite: permission of instructor. Offered: AWPp.

NEUR S 542 Clinical and Basic Research Correlates of Epilepsy (2) *Avellino, G. Ojemann, J. Ojemann, Silbergeld* Clinical symptoms and treatment of epilepsy; related basic research in neuroanatomy, neurophysiology, neuropsychology, and neuropharmacology of epilepsy. Prerequisite: HUBIO 532 for medical students; permission of instructor for others.

NEUR S 680 P-Neurological Surgery Clerkship (*, max. 8) *Avellino, Ellenbogen* Student serves clinical clerkship as an intimate member of the staff, participating in inpatient and outpatient care, both preoperative and postoperative, involving neurological surgery patients. University of Washington Medical Center or a University-affiliated hospital may be selected, subject to approval of the department. Prerequisite: HUBIO 563. (Four weeks.) Offered: AWPp.

NEUR S 697 P-Neurological Surgery Special Electives (*, max. 24) *Avellino, Ellenbogen* By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWPp.

NEUR S 699 P-WWAMI Neurological Surgery Special Electives (*, max. 24) *Avellino, Ellenbogen* By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Neurology

NEURL 495 Community Rehabilitation of the Neurologically Impaired: Internship (*, max. 5) *Fraser, Clemmons* Supervised work with a neurologically disabled vocational rehabilitation population within a multidisciplinary vocational rehabilitation unit. Offered: AWPp.

NEURL 499 Undergraduate Research (*, max. 25) Provides an opportunity to gain research experience and direct participation in clinical or basic science investigation in neurological topics. Offered: AWPp.

NEURL 505 P-Preceptorship in Neurology (1) *Kraus* Provides an opportunity for first and second-year medical students to gain personal experience with neurology practice situations by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Offered: Sp.

NEURL 536 Topics in Clinical Neurology (1) *Spain* Lectures on epilepsy, stroke, coma, drug overdose, dementia, headache, myelopathies, infectious disease. Offered: S.

NEURL 555 Frontiers in Neuroimmunology (1) *Moeller* Current concepts and developments in neuroimmunology. Credit/no credit only. Prerequisite: either NBI0 301 or IMMUN 441. Offered: AWPp.

NEURL 646 P-Clinical Electroencephalography (*, max. 12) *Farrell, Holmes* For third- and fourth-year medical students. Clinical applications of electroencephalography long-term EEG-video-audio monitoring, computer-averaged evoked potentials. Prerequisite: completion of Human Biology series. Offered: AWPp.

NEURL 665 P-Introduction to Neurology (8) *Kraus* Provides the medical student with a general understanding of basic clinical neurology, at sites in Seattle and the WWAMI region. For fourth-year students. Prerequisite: medicine, or family medicine, or surgery, or pediatrics for third-year students. Offered: AWPp.

NEURL 681 P-Seizure Clinic Clerkship (2.5) *A. Wilensky* Evaluation and follow-up of patients with seizure disorders. Limited contact with inpatients. Prerequisite: MED 665 and permission of instructor. Offered: AWPp.

NEURL 686 P-Clinical Neurology (8) *Swanson* Clerkship including both inpatient and outpatient experiences and didactic sessions on neurological subjects. Student assigned to one of the affiliated hospitals and supervised by neurology residents and full-time staff. Offered: AWPp.

NEURL 687 P-Advanced Clinical Clerkship in Child Neurology (*, max. 8) *Gospe* Advanced course in neurology dealing with neurological disease in children. Supervision by child neurology residents and attending. Prerequisite: NEURL 665, third- and fourth-year medical students. (Limit: one student.) Offered: AWPp.

NEURL 697 P-Neurology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions outside the WWAMI region. Students should obtain special assignment form from the Dean's Office at least one month prior to preregistration. Prerequisite: permission of department advisor. Offered: AWPp.

NEURL 699 P-WWAMI Neurology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of advisor. Offered: AWPp.

Obstetrics and Gynecology

OB GYN 498 Undergraduate Thesis (*) *Vontver* By arrangement.

OB GYN 499 Undergraduate Research (*) *Vontver*.

OB GYN 550 P-Voluntary Pregnancy Termination: An Overview of Medical and Social Issues (2) *Easterling, Miller* A flexible curriculum which allows the medical student to

observe in an abortion clinic, read articles and a textbook on abortion. Can be used by medical student as elective credit.

OB GYN 551 Perinatal Care Elective (1)

Provide an introduction and overview of perinatal care for first- or second-year medical students with emphasis on late third trimester, labor and delivery, and postpartum. Opportunity to observe the patient-provider relationship. Optional labor and delivery observation. Offered: AWP.

OB GYN 579 P-Obstetric and Gynecologic Investigation (*)

Vontver The investigation may cover any one of the following fields: normal and complicated pregnancy, hormone assays in obstetrics and endocrinology, obstetric and gynecologic oncology, genetics. By arrangement.

OB GYN 590 HIV and STIs in Women and Children (3)

Examines the emerging global public health crisis and the plight of women and children with HIV/STIs. Reviews targeted approaches pertaining to women and children and their vulnerability to HIV/STIs. Prerequisite: EPI 511 or EPI 512-513. Offered: jointly with EPI 507; Sp.

OB GYN 665 P-Introduction to Obstetrics and Gynecology, UH-HMC (*, max. 12)

Vontver Introductory clerkship providing comprehensive medical care and counseling to female patients. Includes management and delivery of obstetrical patients, diagnosis and management of gynecologic diseases, hospital rounds, outpatient clinics, seminars, tutorial, and community health-care agencies for women. Rotations occur at UWMC and Harborview Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: six students.).

OB GYN 666 P-Introduction to Obstetrics and Gynecology, Boise (*, max. 12)

Vontver Clerkship equivalent to 665 offered at Boise, Idaho (WWAMI). Includes experience in several private physician offices. Prerequisite: HUBIO 565. (Six weeks. Limit: two students. Not offered summer quarter.).

OB GYN 667 P-Introduction to Obstetrics and Gynecology, Madigan (*, max. 12)

Vontver Clerkship equivalent to 665 offered at Madigan Army Medical Center, Tacoma. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.).

OB GYN 668 P-Introduction to Obstetrics and Gynecology, Spokane (12)

Vontver Clerkship equivalent to 665 offered at Spokane (WWAMI). Includes experience in several private physicians' offices. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.).

OB GYN 669 P-Introduction to Obstetrics and Gynecology, Swedish (12)

Vontver Clerkship equivalent to 665 offered at Swedish Hospital Medical Center. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.) Not offered summer quarter.

OB GYN 670 P-Introduction to Obstetrics and Gynecology, GH-Central (12)

Vontver Clerkship equivalent to 665 offered at the Central facility of Group Health Cooperative of Puget Sound in Seattle. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.).

OB GYN 671 P-Introduction to Obstetrics and Gynecology, Anchorage (12)

Vontver Clerkship equivalent to 665 offered at Anchorage, Alaska (WWAMI). Includes experience in several private

physicians' offices as well as Providence Hospital. Prerequisite: HUBIO 565. (Six weeks. Limit: three students.).

OB GYN 672 P-Introduction to Obstetrics and Gynecology, GH-East (12)

Vontver Clerkship equivalent to 665 offered at the Eastside facility of Group Health Cooperative of Puget Sound in Redmond. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.).

OB GYN 673 P-Introduction to Obstetrics and Gynecology, Military, Madigan (12)

Vontver Clerkship equivalent to 665 offered at Madigan Army Medical Center. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: two students.).

OB GYN 675 P-Introduction to Obstetrics and Gynecology, Highline (12)

Clerkship equivalent to 665 offered at Highline Community Hospital. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.).

OB GYN 676 P-Introduction to Obstetrics and Gynecology, Missoula (12)

Clerkship equivalent to 665 offered in Missoula, Montana. Students spend time in delivery room, surgery, and clinic, and have a specific preceptor assigned. Prerequisite: HUBIO 565. (Six weeks. Limit: one student.).

OB GYN 677 P-Introduction to Obstetrics and Gynecology, Rock Springs (12)

Equivalent of OB GYN 665, offered in Rock Springs, Wyoming. Student rotates among outpatient clinic, labor and delivery, operating suites, and medical/surgical inpatient areas. (Limit: two students.) Offered: AWP.

OB GYN 681 P-Gynecological Oncology Subspecialty (8)

Vontver Experience in reproductive tract malignancy, chemotherapy, and radiation therapy. Student follows selected patients through primary surgery, recovery, and initial adjuvant treatment, as well as continuing treatment in both clinic and inpatient settings. Prerequisite: basic OB GYN Clerkship. (Limit: two students each four weeks.).

OB GYN 682 P-Antenatal High-Risk Obstetrics (8)

Vontver Four weeks on high-risk antenatal obstetrics ward and clinic. Students responsible for initial workups, daily laboratory evaluations, continuing care of high-risk antepartum patients. Weekly conference with obstetrics attending; presentation of one or more topics per rotation. Excellent coordination with resident and attending staff required to maintain patient-care continuity. (Limit: two students each four weeks.).

OB GYN 684 P-Endocrinology of Reproduction (*, max. 12)

Vontver The biochemistry of steroids. Steroid metabolism as related to clinical problems. Diagnosis and treatment of endocrine disorders. Case studies with special emphasis on modern methods of investigation and assisted reproductive technology. (Limit: one student each four weeks.).

OB GYN 685 P-Obstetrics and Gynecology Elective (*, max. 8)

Close working relationship with a physician or physicians in the practice of obstetrics and gynecology. May include clinics, hospital rounds, surgery, deliveries, and business aspects of practice.

OB GYN 697 P-Obstetrics and Gynecology Special Electives (*, max. 24)

Vontver By arrangement, for qualified students, special clerkship or research opportunities can sometimes be made available at other institutions. Students wishing this course should obtain special assignment form one month before preregistration. Department evaluates student performance. Prerequisite: permission of instructor.

OB GYN 698 P-Introduction to Obstetrics and Gynecology, Away (*, max. 12)

Vontver Clerkship equivalent to 665 at sites being evaluated as permanent WWAMI sites (currently includes Silverdale, Evergreen, Fairbanks, Sandpoint, Cheyenne, and Billings). By arrangement. Subject to Dean's Office approval. Department evaluates student performance. Prerequisite: HUBIO 565; permission of instructor.

OB GYN 699 P-WWAMI Obstetrics and Gynecology Special Electives (*, max. 24)

By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located outside the WWAMI region. A special assignment form must be obtained one month in advance of preregistration. Prerequisite: permission of department.

Ophthalmology

OPHTH 498 Undergraduate Thesis (*)

Kinyoun (University of Washington Medical Center) Thesis-based research in vision and ophthalmology. Elective. Offered: AWP.

OPHTH 499 Undergraduate Research (*)

Kinyoun (University of Washington Medical Center) Laboratory or clinical research in morphology, biochemistry, immunology, experimental pathology, or clinical studies of the eye and visual system. Offered: AWP.

OPHTH 501 P-Ophthalmology Preceptorship (1)

Kinyoun Individualized experiences with one or more of the full-time faculty members of the department covering research, teaching, and patient care. Student observes activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- and second-year medical student standing and permission of instructor. Offered: AWP.

OPHTH 681 P-Ophthalmology Clerkship (4)

Sires (Harborview Medical Center) Students gain experience in the diagnosis and treatment of common ocular disorders. Basic examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWP.

OPHTH 683 P-Pediatric Ophthalmology Clerkship (4)

Weiss (Children's Hospital and Regional Medical Center) Student examines and observes treatment of children with ocular diseases and learns to differentiate trivial from potentially blinding disorders. Programmed text in general ophthalmology furnished. Prerequisite: University of Washington student and completion of human biology series. (Two weeks, full-time. Limit: one student.) Offered: WS.

OPHTH 685 P-Ophthalmology Clerkship (4)

Orcutt (VA. Puget Sound Health Care System) Participation in diagnosis and treatment of medical and surgical ocular disease. Outpatient

examinations, inpatient surgery, as well as neuro-ophthalmologic, retinal, and glaucoma consultations. Basic techniques involved in tonometry, ophthalmoscopy, and biomicroscopy of eye. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

OPHTH 686 P-Ophthalmology Clerkship (4) *Gorman (Group Health Central)* Diagnosis and treatment of ocular diseases in outpatients. Weekly assignment to Group Health ophthalmologist responsible for the care of walk-in and urgent patients, which may demonstrate findings pertinent to the future practice of primary-care physicians. Examination techniques, including tonometry, ophthalmoscopy, and biomicroscopy. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

OPHTH 687 P-Ophthalmology Clerkship (4) *Kinyoun (University of Washington Medical Center)* Diagnosis and management of commonly seen eye diseases. Subspecialty clinics include cornea, retina, neuro-ophthalmology, glaucoma, contact lenses, and strabismus. Student attends regularly scheduled conferences in ophthalmic basic and clinical science. Prerequisite: completion of human biology series. (Limit: one student.) Offered: AWSpS.

OPHTH 688 P-Ophthalmology Clerkship (8) *Kinyoun, Werner* Four-week externship at Alaska Native Medical Center in Anchorage. Opportunity to learn and practice common eye examination techniques, including slit-lamp biomicroscopy, tonometry, and funduscopy. Patients seen three days a week; two days spent in the operating room. Prerequisite: completion of human biology series, MED 665, and SURG 665; fourth-year medical students only. Offered: AWSpS.

OPHTH 697 P-Ophthalmology Special Electives (*, max. 24) *Kinyoun* By specific arrangement, for qualified students, special clerkship, externship, or research opportunities can at times be made available at institutions or clinics other than the UW. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of instructor. Offered: AWSpS.

OPHTH 699 P-WWAMI Ophthalmology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department. Offered: AWSpS.

Orthopaedics

ORTHP 498 Undergraduate Thesis (*) *Eyre* Student works directly with a preceptor in selecting a suitable area for laboratory or clinical research in the area of orthopaedics, and develops a thesis for recognition. Offered: AWSpS.

ORTHP 499 Undergraduate Research (*) *Eyre* Investigation of pertinent musculoskeletal problems in the orthopaedic laboratories as part of the research group. Offered: AWSpS.

ORTHP 505 P-Preceptorship in Orthopaedic Surgery (1) Opportunity for first- and second-year medical students to gain experience with clinical faculty members in the community. Students observe general aspects of private practice from a longitudinal perspective.

Prerequisite: permission of department. Offered: AWSpS.

ORTHP 585 P-Sports Medicine (2) *O'Kane* Lectures, patient problem presentations, and seminar discussions to explore impact of exercise and sport participation on various body systems. Includes nutritional concerns, biomechanics of certain sports injuries and cardiovascular, pulmonary, and musculoskeletal concerns. Prerequisite: second-year medical student standing. Offered: Sp.

ORTHP 675 P-Preceptorship in Orthopaedics (*, max. 4) *Simonian* Student spends full time with the preceptor during all his or her working day in order to gain a better understanding of the diagnosis and the management of problems of the musculoskeletal system as seen in the private orthopaedic practice. Prerequisite: SURG 665 or HUBIO 553 and permission of department. (Two weeks, full-time.) Offered: AWSpS.

ORTHP 676 P-Pediatric Orthopaedics (*, max. 8) *Diab, Mosca, Song* Acquaints students with all aspects of musculoskeletal problems in childhood. Didactic conferences and seminars, and opportunities for active participation in both inpatient and outpatient care at Children's Hospital and Medical Center, and correlative anatomy and pathology. Prerequisite: SURG 665 or HUBIO 553. (Four weeks, full-time.) Offered: AWSpS.

ORTHP 677 P-Musculoskeletal Trauma (*, max. 8) *Benirschke, Chapman, Hanel, Hansen, Henley, Mills, Mirza, Nork, Routt, Sangeorzan, Smith* Harborview Medical Center. Emergency room, wards, operating room, and outpatient clinics. Instruction in general and special clinics, including hand, hip, foot, and fracture, with emphasis placed on physical examination of the patient. Students take correlative anatomy and pathology. Prerequisite: SURG 665, HUBIO 553. (Four weeks, full-time.) Offered: AWSpS.

ORTHP 678 P-Musculoskeletal Oncology (8/12) *Conrad* In-depth experience on musculoskeletal oncology service with primary involvement in initial evaluation, staging, treatment, and postoperative follow-up of patients with various musculoskeletal malignancies. Elective involves experience in surgical, oncologic, radiologic, and pathologic principles of managing sarcomas. Prerequisite: basic orthopaedic elective or permission of instructor. Offered: AWSpS.

ORTHP 680 P-General Orthopaedic Clerkship (*, max. 8) *Chansky* Veteran's Administration Hospital: structured to provide a basic education in the fundamentals of the musculoskeletal system. Heavy emphasis is placed on the reconstructive alternatives in the treatment of degenerative joint diseases. Prerequisite: completion of HUBIO series; third- and fourth-year students. Enrollment limited to three. Offered: AWSpS.

ORTHP 681 P-Sports Medicine Orthopaedic Clerkship (8) *Allan, Bigos, Bruckner, Clark, Conrad, Larson, Matsen, Mirza, Simonian, Smith, Teitz, Trumble* Orthopaedic subspecialty clerkship at University of Washington Medical Center. Preceptor-based outpatient, inpatient, emergency, or operative orthopaedic care. Students work primarily in one subspecialty area and in one general orthopaedic clinic. For students who plan careers in orthopaedic surgery. Prerequisite: completion of HUBIO series, third- and fourth-year medical students. Offered: AWSpS.

ORTHP 682 P-Outpatient Orthopaedics (8) Outpatient orthopaedic experience at University of Washington Medical Center. Emphasis on physical exam, diagnosis, radiographic evaluation, and non-operative treatment. Rotation through general orthopaedics as well as all subspecialty areas. For students who plan careers in primary care. Prerequisite: completion of HUBIO series. Offered: AWSpS.

ORTHP 684 JP-Adult Reconstructive Spine Surgery for Orthopaedics Clerkship (8) *Chapman* Preceptor-based outpatient, inpatient, emergency, and operative orthopaedic care. Work with faculty specializing in adult reconstructive spine surgery, with a goal to maintain the highest standards of care in the evaluation and management of all patients with spinal disorders. Opportunities to participate in each aspect of this mission. Offered: AWSpS.

ORTHP 685 P-Adult Reconstruction: Total Joint Service (8) *Clark* Preceptor-based outpatient, inpatient, emergency, and operative orthopaedic care. Students work with faculty in the Total Joint Service which specializes in lower extremity adult reconstructive surgery, including: complex primary hip/knee arthroplasty; less invasive approaches to hip/knee arthroplasty; revision hip/knee arthroplasty; periacetabular and proximal femoral osteotomy; osteotomy about the knee; and hip arthroscope. Offered: AWSpS.

ORTHP 687 P-Shoulder and Elbow (8) *Matsen, K. Smith* Preceptor-based outpatient, inpatient, emergency, and operative orthopaedic care. Work with the faculty in the Shoulder and Elbow Service, which provides comprehensive evaluation and management for a wide range of shoulder and elbow problems, including: arthritis, dislocation or instability, fractures, rotator cuff/ tendon tears, joint stiffness, and unsuccessful previous surgery. Offered: AWSpS.

ORTHP 697 P-Orthopaedic External Elective (*, max. 12) *Simonian* Special arrangements can be made for students desiring to take orthopaedic electives at other institutions. Programs generally approved include orthopaedic clerkships at other universities or at large orthopaedic institutes. Prerequisite: HUBIO 553 and permission of department. Offered: AWSpS.

ORTHP 699 P-WWAMI Orthopedics Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Otolaryngology—Head and Neck Surgery

OTOHN 498 Undergraduate Thesis (*) *Rubel, Weymuller* Student works directly with department faculty in selecting a suitable area for laboratory or clinical research in the area of otolaryngology, and develops a thesis for recognition. Offered: AWSpS.

OTOHN 499 Undergraduate Research (*) *Rubel, Weymuller* Research opportunities offered under direction in the area of otolaryngology. (Twelve weeks.) Offered: AWSpS.

OTOHN 501 P-Preceptorship in Otolaryngology — Head and Neck Surgery (1) *Hillel* One morning a week for a total of 30 hours per quarter spent observing patient care in either

inpatient or outpatient settings at the University of Washington Medical Center; associated readings. Prerequisite: first- or second-year medical student standing. Coordinator: OTOHNS office. Offered: AWPoS.

OTOHN 680 Otolaryngology — Head and Neck Surgery Clerkship UW (4/8, max. 24) *Hillel, Makielski, Manning, Weymuller* Introduction to surgical subspecialty of otolaryngology-head and neck surgery. Structured to allow broad introduction to breadth of specialty. Students see patients in clinic, join inpatient rounds, have opportunity to go to operating room. Rotations at UWMC, VAH, HMC, CHMC, Swedish. Prerequisite: human biology series; recommended: MED 665 or SURG 665. Offered: AWPoS.

OTOHN 683 P-Otolaryngology — Head and Neck Surgery Clerkship Madigan (*, max. 8) (*Madigan Army Medical Center*) Individual externship training at outpatient clinic, where visits average twelve hundred per month, supplemented by inpatient assignments. Students may reside at the hospital during externship, using facilities of bachelor officer quarters and hospital mess. Prerequisite: completion of human biology series. (Two or four weeks, full-time.); recommended: MED or SURG 665. Offered: AWPoS.

OTOHN 686 P-Otolaryngology — Head and Neck Surgery Clerkship Greater Seattle Private Practice (*, max. 4) *Weymuller* Clinical in-depth study for the student whose interest lies in pathology of the head and neck. Reasonable flexibility to arrange course content that provides exposure to all aspects of patient care. Prerequisite: permission of chairman; recommended: MED 665 or SURG 665. Offered: AWPoS.

OTOHN 697 P-Otolaryngology — Head and Neck Surgery Away Externship (8) *Weymuller* By specific arrangement. Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: permission of chairman. Offered: AWPoS.

OTOHN 699 P-Otolaryngology — Head and Neck Surgery Clerkship WWAMI (4/8, max. 8) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Pathology

PATH 410 Introduction to Pathology (3) *Narayanan* Basic pathologic processes, including cell and tissue involvement in degenerative processes, cell death, inflammation and repair, immunopathologies, cell cycle events, carcinogenesis, and responses to alterations in hormone and growth factor levels. Illustrative disease conditions are reviewed. Required for physical therapy students. Others with suitable biology background by permission of instructor. Offered: A.

PATH 444 General and Systemic Pathology ([2-3]-, max. 5) *Narayanan* Basic pathologic processes that underlie disease, including cell alterations, genetic and developmental pathology, environmental pathology, neoplasia,

immunopathology, inflammation, infection, and systemic diseases. Correlates gross, functional, and biochemical alterations. For first-year dental students and graduate students. Requires reasonable grounding in biological and chemical sciences. Prerequisite for nondental students: permission of instructor.

PATH 450 Cell Biology of Aging (3) *Martin, Rabinovitch, Wolf* Pathophysiology of aging at cell and tissue levels (cell replication limits, telomere shortening, accrual of oxidative damage, caloric restriction effects, loss of postreplicative cells, longevity assurance genes). Proseminar based on student participation. Undergraduate honors students, graduate students with biology, zoology, genetics or medical sciences back grounds. Prerequisite: permission of instructor. Offered: W.

PATH 498 Undergraduate Thesis (*) Elective.

PATH 499 Undergraduate Research (*) Elective.

PATH 500 Molecular Basis of Disease (3) *Parks* Designed for first and second-year graduate students to introduce the concepts of general pathology at the cellular and molecular levels.

PATH 501 Pathology Proseminars (1) Small group discussions and presentations by students based on critical reading of original papers, or on concurrent seminars, in many areas of experimental pathology and medicine. Topic varies by quarter. Prerequisite: permission of instructor. Offered: AWPoS.

PATH 502 Inflammation and Repair (2) Lecture-seminar; a seminar course dealing with an in-depth examination of the processes involved in inflammation and repair. Credit/no credit only. Prerequisite: permission of instructor. Offered: even years.

PATH 507 Introduction to Pathology Research (2) *Bornfeldt, Swisshelm* Current developments and approaches to investigation of the molecular and cellular basis of disease. Members of the Pathology faculty present and discuss their own research projects. Credit/no credit only. Prerequisite: permission of instructor. Offered: A.

PATH 510 Introduction to Pathology Methods (3) *Bowen-Pope* Laboratory course designed to introduce graduate students to the fundamentals of image analysis, histology, histopathology, post mortem evaluation, surgical pathology, and other methods used to investigate disease etiology, progression, and manifestation in humans and in animal models. Prerequisite: permission of instructor. Offered: Sp.

PATH 511 Topics in Experimental Pathology (1-2, max. 10) *Bornfeldt* Focus on areas of research relevant to experimental pathology. Prerequisite: permission of instructor. Offered: AWPoS.

<t>C MED 512 Introduction to the Anatomical Analysis of Animal Disease (5, max. 10) See Comparative Medicine courses.

PATH 512 Molecular Basis of Disease: Death and Repair (1.5) First in a series designed to introduce students to medically important diseases and physiologic processes and experimental approaches to elucidating the cellular processes underlying these diseases.

Covers basic cell/tissue processes that underlie normal homeostasis and most disease and, including apoptosis, necrosis, stem cells, inflammation, granulation tissue, tissue regeneration, repair and fibrosis.

PATH 513 Mechanisms of Neurodegeneration (1.5) Introduction to the cellular and molecular mechanisms that underlie neurodegenerative diseases, including introduction to the normal development and anatomy of the central nervous system, a review of epidemiologic, genetic, and clinical research tools used in the investigation of these diseases, and a systematic review of the major neurodegenerative diseases.

C MED 514 Comparative Pathology Conference (1, max. 6) See Comparative Medicine courses.

PATH 514 Molecular Medicine (3) *Rosen* Graduate-level introduction to the interplay of basic science and clinical medicine. Covers inflammation, vascular disease, metabolic disorders, cancer biology, and molecular-, gene-, and cell-based therapies. Each topic introduced with a patient history. Offered: jointly with CONJ 514; W.

PATH 515 Molecular Basis of Disease: Atherosclerosis and Myocardial Infarction (1.5) *Bornfeldt, Bowen-Pope, Clowes, Dichek, Murry, Raines, Schwartz, Wight* Introduces medically important diseases and experimental approaches to understanding the basis for diseases and their treatments. Covers atherosclerosis, including lipids, extracellular matrix, cell signaling, inflammation, and downstream complications such as myocardial infarction and arrhythmias. Offered: Sp.

PATH 516 Molecular Basis of Human Genetic Disease (3) Introduces the underlying mechanisms in human genetic disorders, ranging from the single nucleotide, through genomic instability, and chromosomal rearrangements. Includes tissue and organ specific examples of the manner in which these disorders provide insights into human biology. Offered: Sp.

PATH 520 Experimental Pathology Seminar (1) Review of current research in various areas of experimental pathology by members of the department and visiting scientists. Credit/no credit only.

CONJ 520 Anatomy and Autopsy (1/2) *Fligner* See Conjoint Courses.

PATH 522 Hematopathology Seminar (2) *Sabath* Identification of normal lymphocyte and bone marrow subpopulations, diagnosis of leukemias, lymphomas, and benign conditions that resemble them. Emphasis on histopathology, cytochemical, immunological, and molecular markers. Clinicopathologic correlation. Offered: jointly with LAB M 522; even years.

PATH 530 Human Cytogenetics (*, max. 4) *Disteche* Sources and methods of preparation and identification of human chromosomes. Molecular structure and mapping of chromosomes. Human cytogenetic pathology: karyotype-phenotype interactions, chromosome breakage, and cancer cytogenetics. Prerequisite: permission of instructor. Offered: even years.

PATH 535 Fundamentals of Human Disease (*, max. 20) Students study human pathology through participation in the autopsy service under direct supervision of a faculty member. They

analyze the histologic, cellular, and biochemical aspects of selected cases, and present their observations in weekly seminars. Prerequisite: PATH 444 or PATH 555 and permission of course director: graduate students only.

PATH 551 Experimental and Molecular Pathology (2-5, max. 20) Introduction to experimental pathology. A tutorial course designed to introduce a graduate student (medical, dental) or senior undergraduate to selected methods and problems through literature surveys and/or laboratory experience. Exploration of causes at the cellular and molecular levels in the study of disease is emphasized. Prerequisite: permission of instructor.

PATH 552 Contemporary Anatomic Pathology (2-5, max. 30) *Schwartz* Study of recent developments in anatomic pathology. Subject includes areas of basic science and review of systemic pathology. Recent developments and interpretation of these findings are stressed. For pathology residents, fellows, and trainees. Credit/no credit only. Prerequisite: permission of instructor.

PATH 555 Environmental Pathology (3) *Monnat, Rhim* Modern morphologic, cell biological, and molecular approaches to environmental disease associated with exposure/predisposition. Lectures, seminar discussion, and student presentations. Prerequisite: PATH 410 or PATH 444 or HUBIO 520; recommended: ENV H 514 and ENV H 515. Offered: alternate years.

CONJ 560, 561 Tumor Biology (3, 2) See Conjoint Courses.

PATH 560 Molecular Analysis of Human Disease (*, max. 10) Review and discussion of contemporary research on molecular basis of human disease. Focus on mutational mechanisms, genetic instability, AIDS, and cancer. Students participate in weekly group discussion and work with faculty to select, develop, and present discussion topic. Prerequisite: medical, graduate, or professional standing and permission of instructor. Offered: AWSp.

PATH 562 P-Cardiovascular Pathology Conference (*) *Reichenbach* Course consists of two parts: a laboratory review of gross and microscopic cardiovascular pathology of selected autopsied cases followed by a combined clinical (medical and/or surgical) and pathology conference discussing these cases. Prerequisite: HUBIO 540 and permission of instructor.

PATH 563 Neuropathology (*) *Alvord, Shaw, Sumi* Course consists of ten parts. Conferences on gross neuropathology (brain cutting and clinicopathologic correlations) held at six hospitals. Weekly neurology or surgical neuropathology conferences, neuropathology slide show, and neuropathology laboratory case studies. Prerequisite: permission of instructor.

PATH 564 Neuropathology Brain Modeling (4) *Alvord* Designed along clinically important, functional, neuroanatomic lines, generally based first on the embryologic development of the most primitive segmental elements (sensory, motor and association cells, and simple reflexes), followed by the more elaborate suprasegmental elements (cerebellum, colliculi, and forebrain).

PATH 571 Neuroanatomic Pathology (*) *Alvord, Shaw, Sumi* The particular diseases occurring in specific parts of the nervous system are

considered in terms of the segmental, intersegmental, and suprasegmental components. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: 563.

PATH 572 Neuropathologic Reactions (*) *Alvord, Shaw, Sumi* The reactions of the nervous system, considered in terms of congenital malformations, inflammations, vascular, traumatic, metabolic-toxic, degenerative, and neoplastic diseases peculiar to the nervous system as a whole. Clinicopathologic correlations are emphasized. Prerequisite: permission of instructor; recommended as concurrent course: PATH 563.

PATH 576 Systemic Pathology II (3) Case examples of gastrointestinal, hematopoietic, lymphoreticular, musculoskeletal, urinary, skin systems, and forensic pathology discussed by students. Relevant laboratory interpretations. Student presentations. Prerequisite: HUBIO 520 or equivalent general pathology course, and permission of instructor.

PATH 584 Neuropathology Brain Modeling Laboratory (4) *Alvord* Clinically important, functional neuroanatomic study based on embryologic motor, sensory, and association cells and simple reflexes, followed by the more elaborate suprasegmental elements (cerebellum, colliculi, forebrain). Three-dimensional neuroanatomical relationships, critical for understanding neuropathology, can best be obtained in constructing a brain model. Prerequisite: PATH 564, which may be taken concurrently.

PATH 600 Independent Study or Research (*) Credit/no credit only.

PATH 665 P-Surgical Pathology (*) Study of fresh current gross surgical specimens and autopsy specimens and their correlation to a patient's clinical course through observation of pathologists working in a large hospital setting. Prerequisite: permission of instructor.

PATH 666 P-Renal Pathology Conference (1) Conference-seminar on the histopathologic aspects of renal disease. May be taken concurrently with MED 693. For third- and fourth-year students. Prerequisite: permission of instructor.

PATH 667 P-Renal Pathology Laboratory (*, max. 6) Laboratory elective for third- and fourth-year medical students. Read current literature, review various renal biopsies and urine sediments, and read standard texts prior to a weekly topic-oriented conference. All students earn 1 credit for one-hour seminar per week. May be taken concurrently with MED 693. Prerequisite: permission of instructor.

PATH 668 P-Skin Pathology (*) Histopathological aspects of skin diseases are presented and discussed in a group-conference type of seminar. Current dermatologic cases also are discussed. Prerequisite: dermatology elective and permission of instructor.

PATH 673 P-Cardiovascular Pathology (*) *Reichenbach* Spectrum of cardiovascular pathology covered in depth by case studies and gross and microscopic material. Case analysis for presentation, including clinical and gross and microscopic material, prepared outside of class time. Clinicopathologic correlation is emphasized. Prerequisite: HUBIO 540 and permission

of instructor and second-year medical student standing.

PATH 679 P-Pathology Summer Clerkship (*, max. 24) Dissection, writeup, and literature review of autopsy. Emphasis on etiology and pathogenesis of disease as a biological process. Designed for students who have not completed organ systems as covered in Human Biology courses. Prerequisite: HUBIO 520 and completion of first year of medical school.

PATH 680 P-Diagnostic Pathology Clerkship — University of Washington Medical Center (*, max. 24) *Swanson* Medical student participation in dissection and study of autopsy and surgical pathology cases. Cases worked up under senior staff, including dissection, microscopic examination, and literature review. Attendance at pathology conferences and seminars expected. Prerequisite: third- or fourth-year student standing.

PATH 681 P-Diagnostic Pathology Clerkship — Harborview Medical Center (*, max. 24) *Deubner* .

PATH 682 P-Diagnostic Pathology Clerkship — Veterans Administration Hospital (*, max. 24) *Thorning* .

PATH 683 P-Diagnostic Pathology Clerkship — Medical Examiner's Office (*, max. 24) *Raven* .

PATH 685 P-Diagnostic Pathology Clerkship — Sacred Heart Hospital, Spokane (*, max. 24) *Williamson* .

PATH 686 P-Diagnostic Pathology Clerkship — Overlake Medical Center (*, max. 24) .

PATH 687 P-Diagnostic Pathology Clerkship — Children's Hospital and Medical Center (*, max. 24) *Patterson* .

PATH 688 P-Diagnostic Pathology Clerkship — Madigan Army Medical Center (*, max. 24) .

PATH 689 P-Diagnostic Pathology Clerkship — Valley Medical Center (*, max. 24) .

PATH 690 P-Diagnostic Pathology Clerkship — Northwest Medical Center (*, max. 24) *Patton* .

PATH 691 P-Diagnostic Pathology Clerkship — General Hospital of Everett (*, max. 24) .

PATH 692 P-Diagnostic Pathology Clerkship — Group Health Cooperative (*, max. 24) .

PATH 697 P-Pathology Special Electives (*, max. 24) By specific arrangement, students can have clerkships, externships, or research opportunities at institutions other than the University of Washington. Students who wish to elect this course should obtain Special Assignment forms from the Dean's office at least one month before advance registration. Prerequisite: permission of instructor.

PATH 699 P-WWAMI Pathology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

PATH 700 Master's Thesis (*).

PATH 800 Doctoral Dissertation (*).

Pediatrics

PEDS 498 Undergraduate Thesis (*) Bennett
For medical students. Offered: AWPpS.

PEDS 499 Undergraduate Research (*) Bennett
Participation in various clinical or basic research programs in progress, specifically: child development, developmental biology, human embryology and teratology, medical genetics, infectious diseases, neonatology, neuroembryology, cardiology, endocrinology and metabolism, immunology, respiratory disease. Offered: AWPpS.

PEDS 505 P-Preceptorship in Pediatrics (1) Bennett
To provide opportunity for first- and second-year medical students to gain personal experience with medical practice situations for pediatricians by being stationed with carefully selected clinical faculty members in their offices. Prerequisite: permission of instructor. Enrollment limited. Coordinator: Department of Pediatrics. Credit/no credit only. Offered: AWPpS.

PEDS 530 P- Homeless Youth and Their Medical Care (1) Deisher, Smith
Clinic-based setting for seminar and interview practice with adolescents; students learn how to deal with special health problems and other related problems of "street kids" through interviews and observations. Credit/no credit only. Offered: W.

PEDS 611 City Doc FREE-TEEN Clinic (*, max. 24) Breuner, Giesel
Participation in a free clinic for out-of-home youth, either Monday or Tuesday evenings. Clinical services include general medical care, with a focus on reproductive health, STD evaluations/treatment, and the impact of a homeless lifestyle on general health. Offered: AWPpS.

PEDS 630 P-WRITE Pediatrics Clinical Clerkship (*, max. 24)
Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

PEDS 661 P-Pediatric General Clerkship, Anchorage (*, max. 24) Lyon
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 662 P-Pediatric General Clerkship (*, max. 24) Newman
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 663 P-Pediatric General Clerkship (*, max. 24) Schweich
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Location preferences are considered. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 664 P-Pediatric General Clerkship (*, max. 24) Bradford
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 665 P-Pediatric General Clerkship (*, max. 24) Bennett
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department or clinic. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 666 P-Pediatric General Clerkship (*, max. 24) Marron
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 667 P-Pediatric General Clerkship (*, max. 24) Newman
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 668 P-Pediatric General Clerkship (*, max. 24) Stucky
General introductory pediatric clerkship. One-half in hospital setting; one-half in outpatient department, clinic, or private office. Open to all third- and fourth-year medical students. Prerequisite: HUBIO 563. (Six weeks, full time. Limit: twenty-four students.) Offered: AWPpS.

PEDS 669 P-Neonatal Pediatrics-Clerkship (*, max. 24) Gleason
Participation in the activities in the newborn and premature divisions; ward rounds, seminars, conferences, and familiarization with certain laboratory techniques, particularly those relating to acid-base balance. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWPpS.

PEDS 670 P-Pediatric Infectious Diseases (*, max. 24) Rubens
Students see and work up clinic consultations and present in detail to attending physician. Daily rounds include problem-solving discussions and didactic presentations in broad category of infectious diseases. Opportunity for experience in clinical research and laboratory techniques. Prerequisite: PEDS 665 or permission; third- or fourth-year medical student standing. (Limit: one student.) Offered: AWPpS.

PEDS 671 Pediatric Endocrinology (*, max. 24)
Focuses on the evaluation of the normal progression of hormone mediated processes in children and the recognition, diagnosis and management of a variety of endocrine problems. Includes participation in clinics, inpatient endocrine rounds and a variety of conferences at Children's Hospital and Regional Medical Center.

PEDS 673 P-Office Practice (*, max. 12) Bennett
Opportunity to observe and function in the private office settings of a number of clinical pediatric faculty and to accompany pediatricians as they pursue their daily activities in the community. Prerequisite: PEDS 665. Offered: AWPpS.

<t>CONJ 677 P-Clinical Allergy and Immunology (*, max. 12)
See Conjoint Courses.

PEDS 679 P-Clinical Problems in Developmental Disabilities (*, max. 12) Bennett
Experience in multidisciplinary evaluation and management of the handicapped child. Student performs pediatric evaluations, obtains appropriate consultations, observes additional professional assessments (e.g., psychological testing), and plans rehabilitation program. Opportunity to provide parent counseling. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWPpS.

PEDS 680 P-Pediatric Clinics (*, max. 24) Bennett
One to ten half-day sessions may be elected each week for four weeks in the following areas: general pediatrics, endocrinology, neurology, immunology, arthritis, cardiology, congenital defects and retardation, well-child, teratology, adolescent medicine, allergy, cystic fibrosis, hematology, prematurity, neonatology, and poison control. Enrollment limited. Prerequisite: PEDS 665.

PEDS 681 P-Pediatric Genetics (*, max. 24) Pagon
Clinical focus on evaluation and management of children with genetic disorders. Exposure to genetic counseling, the evaluation of children with hereditary structural defects, and diagnosis and management of children with inborn errors of metabolism. Emphasis on genetic mechanisms that cause human disease. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks. Limit: one student.) Offered: AWPpS.

PEDS 682 P-Congenital Defects-Clinical Experience (*, max. 24) Chance, Davis
Advanced course in pediatrics providing experience in the clinical diagnosis and management of structural and metabolic congenital defects. Prerequisite: permission of instructor. (Limit: one student.) Offered: AWPpS.

PEDS 683 P-Pediatric Nephrology (8) Eddy
Four-week elective clerkship at Children's Hospital and Medical Center. Students participate in nephrology and transplant rounds, consult with renal fellows and attendings, and work up patients in renal clinics. Participation in seminars; special course in fluid balance. Prerequisite: third- or fourth-year medical student, PEDS 665, and MED 665 or equivalent. (Limit: two students.) Offered: AWPpS.

PEDS 684 P-Pediatric Pulmonary Medicine (8) Redding
Respiratory disorders, diagnostic techniques and treatments unique to children in the inpatient, intensive care, and outpatient settings. Application of principles of pulmonary physiology to clinical problems. Students conduct consultations under the supervision of the attending and present a topic of choice. Inpatient rounds and clinics. Prerequisite: PEDS 665, fourth-year medical student standing. (Limit: one student.) Offered: AWPpS.

PEDS 685 P-Pediatric Hematology and Oncology (*, max. 24) Bernstein
One-on-one teaching plus four weekly didactic sessions. Specific training in techniques and interpretation of bone marrow aspirations, intravenous chemotherapy, transfusions, and laboratory techniques of hematologic evaluation. Self-learning programs available. Prerequisite: PEDS 665. (Two, four, six, or twelve weeks, full-time.) (Limit: one student.) Offered: AWPpS.

PEDS 686 P-Pediatric Cardiology (*, max. 24) Guntheroth, Kawabori
Emphasis on physical diagnosis and electrocardiography and on clinical

knowledge of diagnostic techniques and surgical possibilities for inpatients and outpatients with cardiovascular problems. Opportunity to observe catheterizations and cardiovascular operations. Weekly clinics and twice-daily inpatient rounds. Prerequisite: PEDS 665. (Limit: one student.) Offered: AWSpS.

PEDS 691 P-Advanced Pediatric Clerkship (*, max. 24) *Bennett* Inpatient and/or outpatient experience with responsibilities comparable to intern for patient workup, diagnosis, and care. Available at any one, or combination, of affiliated hospitals, including WWAMI units in Alaska, Idaho, Montana, or Washington. Students interested in this option should make arrangements well in advance of registration. Prerequisite: PEDS 665. (Limit: two students.) Offered: AWSpS.

PEDS 697 P-Pediatric Special Electives (*, max. 24) *Benentt* By specific arrangement, for qualified students, special clerkship externship or research opportunities at institutions other than University of Washington. The faculty can advise of possible opportunities. Obtain special assignment form from Dean's office at least one month before preregistration. Prerequisite: permission of instructor at away site. Offered: AWSpS.

PEDS 699 P-WWAMI Pediatrics Special Electives (*, max. 24) *Bennett* By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department at away site.

Pharmacology

PHCOL 401 General Pharmacology I (2-4, max. 4) *Wang* Principles governing drug-receptor interactions, dose-response relationships, desensitization, and tolerance. Drug toxicity, allergy, mutagenesis, and carcinogenesis. Pharmacogenomics and DNA/RNA therapies. General pharmacology of drugs acting on the endocrine and vascular systems. For pharmacy students and other undergraduates. Offered: A.

PHCOL 402 General Pharmacology II (3/4) *Storm* General pharmacology of drugs acting on the autonomic, cardiovascular, and central nervous systems. For Pharmacy students and other undergraduates. Prerequisite: PHCOL 401. Offered: W.

PHCOL 434 General Pharmacology (2) *Halpern, Watson* Lectures concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students. Offered: A.

PHCOL 435 General Pharmacology (2) *Halpern, Watson* Lectures concerning the action of drugs on physiological and pathological processes with special emphasis on agents of special importance in the practice of dentistry. For dental students. Offered: W.

PHCOL 498 Undergraduate Thesis (*) Offered: A.

PHCOL 499 Undergraduate Research (*) Participation in departmental research projects. Offered: AWSpS.

PHCOL 507 Pharmacology Seminar (1) Presentation of comprehensive reports on recent medical and scientific literature in fields of current importance. Research progress reports, and reports on results of completed research. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 510 Drug Discovery and Emerging Therapeutics (2) *Zheng* Consideration of the general principles and current approaches involved in modern drug discovery and development, with an emphasis on basic concepts in drug action, delivery, and metabolism. Discussion of novel drug discovery techniques and emerging non-standard therapeutics. Prerequisite: organic chemistry, biochemistry, and introductory anatomy and physiology. Offered: W.

PHCOL 511 General Pharmacology I (2) *Nathanson* Consideration of the pharmacology of the cardiovascular and autonomic nervous systems. Emphasizes the mechanisms of neurotransmitter, hormone, drug action at autonomic synapses, and the molecular basis for physiology and pathophysiology of the cardiovascular system. Lectures, group discussion, and analysis of recent research. Prerequisite: organic chemistry, biochemistry, introductory anatomy, and physiology. Offered: W.

PHCOL 512 General Pharmacology II (1-5, max. 5) *Bajjalieh* Consideration of the neurobiological basis of drug action on the central nervous system, including mechanism of action and therapeutic use in psychiatric disorders; neurodegeneration/neuroinflammation; control of neuronal excitability and pain; and drug abuse and addiction. Lecture, group discussion, and analysis of recent research. Prerequisite: organic chemistry, biochemistry, introductory anatomy, and physiology. Offered: Sp.

PHCOL 513 Endocrine Pharmacology and Chemotherapeutics (2) *McKnight* Consideration of the pharmacology of endocrine systems including the hypothalamic/pituitary regulatory peptides, glycoprotein hormones/growth factors, peptide and steroid hormones. Basic principles of chemotherapy of endocrine and other cancers, as well as viral and microbial diseases. Lecture, group discussion, and analysis of recent research. Prerequisite: organic chemistry, biochemistry, introductory anatomy, and physiology. Offered: Sp.

PHCOL 514 Current Topics in Pharmacology (1) *McKnight* Current research related to the mechanisms of drug action presented in a seminar format. Presentations include relevant background material as well as detailed experimental results taken from current research articles. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 515 General Pharmacology Laboratory (*, max. 9) Laboratory course for professional and graduate students who wish to do independent laboratory research under the direction of a specific faculty member. Prerequisite: permission of instructor. Offered: AWSp.

PHCOL 519 Introduction to Laboratory Research in Pharmacology (4) *Storm* On a rotation basis students carry out individual research projects in the laboratories of different faculty members. At the end of each quarter students make formal presentations of their work.

For first-year graduate students in pharmacology. Offered: AWSpS.

PHCOL 527 Drug Metabolism (4) *Rettie* Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Open to medical and graduate students. Prerequisite: one year graduate, medical, or dental biochemistry, or permission of instructor. Offered: jointly with MEDCH 527; odd years; W.

PHCOL 529 Ion Channel Pharmacology (2) *Catterall, Tempel* Current topics in ion channel structure, function, genetics, and pharmacology, including consideration of role in electrical signaling in cell membranes and information transfer and processing in nervous system, inherited diseases of ion channels, and sites and mechanisms of action of drugs and toxins. Prerequisite: CONJ 532 and CONJ 536 or permission of instructor. Offered: odd years; A.

PHCOL 530 Neuronal Signaling Pathways (2) *Beavo, Pham, Storm, Xia* Advanced consideration of the molecular events between drug or hormone binding to receptors and the resulting responses. Emphasizes roles played by signal transduction pathways in regulation of synaptic plasticity, memory formation, neuronal apoptosis and developmental neurobiology. Prerequisite: UCONJ 532 or permission of instructor. Offered: even years; W.

PHCOL 531 Genetic Analysis of Signaling Systems (3) *McKnight, Moon* Current topics involving signal transduction are discussed with an emphasis on genetic analysis of multicellular systems and creative experimental design. Prerequisite: 9 credits of graduate-level courses in molecular and cellular biology, biochemistry, or genetics, or permission of instructor. Offered: odd years; Sp.

PHCOL 534 Molecular Basis of Addictive Drug Action (2) *Chavkin, Mackie, Stella* Advanced consideration and discussion of current literature addressing the basis of opiate, psychostimulant, and cannabinoid effects on signal transduction events, electrical activity of neurons, and drug-motivated behaviors in animal models of human drug abuse. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; A.

PHCOL 535 Transcriptional Control in Human Disease (3) *Bomsztyk, Wang* Advanced consideration and discussion of the mechanisms regulating transcription/gene expression and of aberrant transcription factors which disrupt this process found in cancer and other human diseases. Prerequisite: PHCOL 512 or permission of instructor. Offered: even years; Sp.

PHCOL 536 Free Radicals in Health and Disease: A Pharmacological Perspective (2) *Hinds, Vincenzi* Exploration of chemistry and properties of free radicals and related reactive-oxygen and nitrogen species. Review of biological effects of free radicals and reactive oxygen and nitrogen species with a view toward pharmacological intervention. Analysis of literature implicating free radicals in disease processes. Prerequisite: permission of instructor. Offered: odd years; Sp.

PHCOL 549 Molecular Basis of Neurodegenerative Disease (2) *La Spada, Muchowski, Pallanck* Introduces a broad range of neurodegenerative diseases, focusing upon the approaches that have led to recent discoveries and emphasizing the elucidation of mechanisms

and pathways of disease pathogenesis. Offered: jointly with GENOME 549/NEUBEH 549.

PHCOL 550 An Overview of Faculty Research (1) *Wang* Reviews research topics currently being studied in pharmacology. Student reads articles published on each topic. Credit/no credit only. Prerequisite: first-year student standing in pharmacology. Offered: A.

PHCOL 560 Regulation of Cell Function by Cyclic Nucleotide Phosphodiesterases (1) *Beavo* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on practical problem solving, data analysis, and presentation of methods important to understanding published data and designing new experiments in this area of research. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 561 Molecular Properties of Ion Channels (1) *Catterall* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of sodium and calcium channels and the mechanism of action of drugs on them. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 562 Regulation of Synaptic Physiology (1) *Chavkin* Discussion of research strategies and methodologies involved in the regulation of signal transduction and synaptic physiology. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 563 Signal Transduction Mechanisms in Neuroplasticity and Neuron Growth (1) *Storm* Discussion of research strategies, methodologies, and literature relating to signal transduction mechanisms important for neuroplasticity and regulation of neuron growth in the central nervous system. Emphasis on practical problem solving, data analysis, and presentation methods important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 564 Cellular Regulation by Protein Kinases (1) *McKnight* Analysis of research problems, techniques, and emerging concepts in the study of the function of protein kinases. Emphasis on critical evaluation of research and development of presentation skills. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 565 Intercellular Signaling in Development (1) *Moon* Molecular genetic approaches to dissecting the roles and mechanisms of intracellular signaling during development. Emphasis on vertebrate genes related to *Drosophila* segment polarity genes. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 566 Molecular Pharmacology of Neurotransmitter and Neurokinin Receptors (1) *Nathanson* Discussion of research strategies and methodologies in the areas of molecular neurobiology and signal transduction of muscarinic receptors, G-proteins, and neurokinin receptors. Emphasis on practical problem solving, data analysis, and presentation methods

important to modern scientific work. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 567 Mechanisms of Carcinogenesis (2) *Xia* Lectures/presentations of biochemical and molecular basis of carcinogenesis induced by environmental agents, including approaches to identification of carcinogens. Role of cell proliferation and cell death (apoptosis) in cancer formation and cancer treatment. Molecular mechanisms that regulate proliferation and apoptosis. Prerequisite: ENV H 516, ENV H 405, or permission of instructor. Offered: jointly with ENV H 567; A.

PHCOL 568 Pharmacology of Free Radicals (1) *Vincenzi* Advanced considerations of current literature and experimental design, implementation and interpretation of research dealing with the effects of reactive oxygen species and free radicals on cell membranes and cells. Discussion of the relationships of such phenomena to human disease and the effects of drugs thereon. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 569 Molecular Genetics of Potassium Channel Function (1) *Tempel* Discussion of research strategies, methodologies, and literature concerning the structure, function, and regulation of potassium channel genes and their role in behavior as studied in mutant mice. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 571 Molecular Mechanisms of Neurosecretion (1) *Bajjalieh* Discussion of research strategies, methodologies, and literature relating to regulation of cyclic nucleotide levels in the cell. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

PHCOL 572 Transcriptional Regulation of Growth Control Genes (1) *Wang* Discussion of research strategies, methodologies, and literature relating to proliferative growth control, cellular differentiation, and gene expression. Emphasis on practical problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor.

PHCOL 573 Signaling Systems Linked to Neuroinflammation (1) *Stella* Discussion of research strategies, methodologies and literature related to neuroinflammation, microglial cell activation, and the cannabinoid signaling pathway. Emphasis on solving practical problem, data analysis, and presentation. Prerequisite: permission of instructor. Offered: A, W, Sp, S.

PHCOL 574 Molecular and Cellular Basis of Chaperone Function and Protein Misfolding Diseases (1) *Muchowski* Analysis of research problems, techniques and emerging concepts in the study of the molecular chaperones and protein misfolding diseases. Emphasizes experimental problem solving, data analysis, and development of presentation skills. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 575 Structural Biology of Ubiquitination (1) *Zheng* Discussion of research strategies, methodologies and literature concerning the structure, function, and regulation of ubiquitin-protein ligases and the mechanism

underlying ubiquitination and ubiquitin-dependent proteolysis. Emphasis on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: A/WSpS.

PHCOL 600 Independent Study or Research (*) Pharmacology graduate students only. Offered: A/WSpS.

PHCOL 700 Master's Thesis (*) Pharmacology graduate students only. Offered: A/WSpS.

PHCOL 800 Doctoral Dissertation (*) Pharmacology graduate students only. Offered: A/WSpS.

Physiology and Biophysics

CONJ 401, 402, 403 Human Anatomy and Physiology (4, 4, 4) *Linder, Melby* See Conjoint Courses.

P BIO 405 Human Physiology (4-) *Wordeman* Intensive coverage of physiology through lectures, conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids; neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: A.

P BIO 406 Human Physiology (4-) *Hlastala* Intensive coverage of physiology through lectures, conference. Autumn Quarter: excitable tissue, skeletal muscle; spinal reflex; cardiovascular, respiratory physiology; acid base balance; autonomic nervous system; temperature regulation. Winter Quarter: renal, body fluids; neuroendocrinology; reproductive, gastrointestinal, neurophysiology. Required for dental, graduate nursing, and bioengineering students. Also offered for graduate students. Offered: W.

P BIO 424 Vision and Its Physiological Basis (5) NW *Teller* Behavioral neurobiology of human vision: color vision, acuity and spatial vision, light and dark adaptation, visual development. Correlation of visual functioning with known optical, biochemical, physiological, and anatomical substrates. Prerequisite: 2.0 in either PSYCH 333, NBIO 302, or PHIL 160. Offered: jointly with PSYCH 424; W.

P BIO 498 Undergraduate Thesis (*) Offered: A/WSpS.

P BIO 499 Undergraduate Research (*) Offered: A/WSpS.

P BIO 505 Topics in Physiology (0.5) Topics include excitation-contraction coupling, muscle structure, and molecular basis of contraction, regulation of contraction, muscle mechanisms, energetics, and adaptation. Emphasis on skeletal muscle with some discussion of cardiac and smooth muscle. Series of six lecture discussions. Prerequisite: first-year P BIO graduate student. Offered: A.

P BIO 507 Cardiovascular and Respiratory Physiology (3) Cardiovascular physiology: the heart, microcirculation, hemodynamics, regional circulation, and reflex integration. Respiratory physiology: the lung, pulmonary circulation, alveolar ventilation, gas exchange, control of

breathing, acid-base regulation, exercise. Offered: W.

P BIO 508 Introduction to Laboratory Research in Physiology (2-5) Students participate in the performance of ongoing projects in designated research laboratories. Emphasis is on experimental design, methodology and techniques. For first- and second-year graduate students in physiology and biophysics to provide a basis for future independent research. Offered: AWSpS.

P BIO 509 Neuroendocrinology (3) *Steiner* Emphasizes the cellular and molecular aspects of several topics in neuroendocrinology, including neuropeptide genes, reproduction, steroid hormone regulation of gene expression, mechanisms of hormone action, endocrine rhythms, and neural oscillations. Prerequisite: either BIOL 201, BIOL 202, and BIOL 203, or BIOL 180, BIOL 200, and BIOL 220; BIOC 440, BIOC 441, BIOC 442 or permission of instructor. Offered: jointly with NEUBEH 541; W, odd years only.

P BIO 510 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: A.

P BIO 511 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: W.

P BIO 512 Physiology Survey (2) Reading and discussion of the research literature in cellular, molecular, and systems physiology. Students write a critical evaluation of each paper in the manner of a peer review. All three quarters are required for second-year P BIO students. Prerequisite: completion of one year of P BIO graduate study. Offered: Sp.

P BIO 513 Practicum in Teaching Physiology and Biophysics (4) Students undertake instructional material development, presentation of materials and develop problem-solving techniques. Credit/no credit only. Offered: AW.

P BIO 516 Physiological Proseminar (7) *Hlastala* Guided survey of the experimental literature in cardiovascular and respiratory physiology. Course conducted as seminar with oral analysis of assigned papers and topics. Prerequisite: permission of instructor. Offered: A.

P BIO 518 Research Topics in Cardiovascular Physiology (1) *Feigl* Graduate students and faculty members present and discuss current literature and research. Prerequisite: permission of instructor.

P BIO 519 Membrane and Muscle Biophysics Seminar (1) *Hille* Lectures on current research topics in cell membrane function and muscle contraction. Credit/no credit only. Prerequisite: permission of instructor. Offered: Sp.

P BIO 520 Physiology Seminar (*) Selected topics in physiology. Prerequisite: permission of instructor.

P BIO 521 Biophysics Seminar (*) Selected topics in biophysics. Prerequisite: permission of instructor.

P BIO 522 Selected Topics in Respiratory Physiology (1-3, max. 3) *Hildebrandt* Advanced seminar on selected topics, including pulmonary mechanics, gas exchange, lung fluid balance, regulation of breathing, pulmonary circulation, respiration in the neonate, liquid breathing, airway dynamics, lung structure and development, cardiopulmonary interactions, exercise physiology. Prerequisite: permission of instructor. Offered: AWSpS.

P BIO 523 Heat Transfer and Temperature Regulation (2-5, max. 5) *Brengelmann* Thermal exchange between the body surface and the environment. Heat production and distribution within the body. Properties of cutaneous and deep temperature receptors. Neural integration and homeothermy. Prerequisite: permission of instructor.

P BIO 525 Readings in Advanced Physiology and Biophysics (*) Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: A.

P BIO 526 Readings in Advanced Physiology and Biophysics (*) Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: W.

P BIO 527 Readings in Advanced Physiology and Biophysics (*) Guided study of the experimental literature of physiology and biophysics. Essays are written and discussed with the staff. Emphasis is placed on critical analysis, accuracy of expression, bibliographical technique, and other factors of good scholarship. Prerequisite: permission of instructor. Offered: Sp.

CONJ 531 Signaling Mechanisms in Excitable Cells (1.5) See Conjoint Courses.

P BIO 532 Discussion in Cell Signaling and Molecular Physiology (2) Discusses fundamental issues in cell excitability and molecular and cellular physiology. Focuses on problem solving and reading from original literature. Emphasizes student participation. Prerequisite: first-year graduate students in neurobiology or physiology and biophysics. Offered: jointly with NEUBEH 532; A.

P BIO 541 Motor Systems I: Peripheral, Spinal, and Cortical Mechanisms (3) *Binder, Fetz* Discussion of research papers on the physiology of the motor unit and the spinal and cortical neurons that control motor unit activity. Prerequisite: NEUBEH 501-503 or permission of instructor.

P BIO 542 Motor Systems II: Brainstem Mechanisms (3) *Anderson, Fuchs* Critical discussion of research papers and resulting concepts regarding the roles of various brainstem systems in controlling somatic and ocular movements. Each student is responsible for leading the discussion of one topic.

Prerequisite: NEUBEH 502 and NEUBEH 503 or equivalent and permission of instructor.

P BIO 544 Properties of Neurons (3) Critical reading and discussion of papers on passive, active, and integrative properties of single invertebrate and mammalian neurons. Provides understanding of how a variety of cellular mechanisms contribute to neuronal discharge patterns. Prerequisite: CONJ 501, CONJ 502, CONJ 503 and NEUBEH 501, NEUBEH 502, NEUBEH 503 or equivalent and permission of instructor. Offered: even years; A.

P BIO 545 Quantitative Methods in Neuroscience (3) *Rieke, Shadlen* Discusses quantitative methods applicable to the study of the nervous system. Revolves around computer exercises/discussion of journal papers. May include linear systems theory, Fourier analysis, ordinary differential equations, stochastic processes, signal detection and information theory. Prerequisite: NEUBEH 501, 502, 503, or by permission of instructor. Offered: jointly with NEUBEH 545; W.

P BIO 547 Readings in Cell Physiology (2/3, max. 15) *Hille* Reading and discussion of research literature on excitable cells. Emphasis on membrane excitability, transport, contractility, growth factors, and extracellular matrix. Topics vary. Prerequisite: CONJ 501 or equivalent. Offered: W.

P BIO 549 Plasticity in the Vertebrate Nervous System (2) Emphasis on mammalian CNS. Examples of anatomical, pharmacological plasticity chosen from literature. Structure changes during development and in adult (hippocampus, spinal cord, nerve-muscle) studied and as correlates of learning. Students responsible for leading class discussion of one topic. Credit/no credit only. Prerequisite: graduate-level courses in neurophysiology and neuroanatomy; understanding of basic neuronal mechanisms. Offered: even years; Sp.

P BIO 550 Biophysics of Calcium Signaling (1) *Hille, Santana* Introduction to cellular calcium signaling including theoretical and technical issues of calcium signal detection and biological conclusions. Prerequisite: CONJ 531 Offered: jointly with NEUBEH 550; odd years; Sp.

P BIO 551 Mouse Models (1) Illustrates the use of transgenic and targeted-gene disruption technologies for developing mouse models of the disease. Introduces the methodology of producing transgenic and knock out mice. Discusses several examples of disease models using the most recent primary literature as a source. Offered: jointly with NEUBEH 551.

P BIO 552 Synaptic Integration (1) *Binder, Powers* Discussion of recent papers on how neurons in the central nervous system integrate concurrent synaptic inputs. Includes: effects of driving force on synaptic currents, effects of conductances on dendritic properties, transfer of currents from dendrites to soma, and transformation of currents into spike train outputs. Offered: jointly with NEUBEH 552.

P BIO 553 Learning and Memory: Synapses and Systems (2) *Jagadeesh, Sullivan* Five-week mini-course evaluates the current state of knowledge on the mechanisms that allow people to learn and remember. After introductory overviews of the cellular and molecular mechanisms underlying long-term synaptic plasticity and the multiple systems existing for

learning and memory, students choose specific topics for discussion. Offered: jointly with NEUBEH 553.

P BIO 554 Motor Learning: Cellular and Network Mechanisms (1) *Fetz, Perlmutter* Five-week mini-course reviews the current state of research on cellular and network mechanisms of motor learning. After an introductory overview of behavioral and physiological examples of motor learning in various species and systems, students choose specific topics for discussion, using the primary literature as a source. Offered: jointly with NEUBEH 554.

P BIO 555 Sensory Receptors (1) *Detwiler, Rieke* Five-lecture mini-course examines how different kinds of sensory receptors detect and respond to different modalities of sensory stimuli. Discussion focuses on the cellular and molecular mechanisms of the underlying transduction processes and the experimental evidence that they are based on. Offered: jointly with NEUBEH 555.

P BIO 556 Axon Pathfinding Mechanisms (1) *Bothwell* Examines mechanisms governing axon growth cone behavior during embryonic development and during regeneration in the injured adult. Discusses approaches employing both invertebrate and vertebrate model systems. Offered: jointly with NEUBEH 556.

P BIO 557 Ion Channel Gating (1) *Gordon, Zagotta* Compares and contrasts mechanisms of gating in ligand-gated and voltage-gated ion channels. Covers basics of ligand gating and voltage gating, kinetic schemes, inactivation and desensitization, gating currents and partial agonists, and ion channel structure. Offered: jointly with NEUBEH 557.

P BIO 560 Muscle and Cell Motility (*) Selected topics in muscle contraction and cell motility. Reading of original papers. Presentations by students and faculty. Topics vary. Prerequisite: permission of instructor.

P BIO 594 Neurological Study Unit (0.5) Faculty and student discussion of neurological topics illustrated with clinical cases or demonstrations include the following: physiology, neuroanatomy, neurology, neuropathology, neurosurgery, and psychiatry. Credit/no credit only. Prerequisite for medical students: HUBIO 532. Offered: AW.

P BIO 600 Independent Study or Research (*) Offered: AWSp.

P BIO 700 Master's Thesis (*) Offered: AWSpS.

P BIO 800 Doctoral Dissertation (*) Offered: AWSpS.

Psychiatry and Behavioral Sciences

CONJ 475 Alcoholism: A Course for Medical Students in the Allied Health Sciences (2) See Conjoint Courses.

PBSCI 498 Undergraduate Thesis (*) Opportunity to complete work on psychiatric research projects or to pursue a specific psychiatric topic in depth, for instance, through library research.

PBSCI 499 Undergraduate Research (*, max. 15) Opportunities are available for participation in

a wide variety of ongoing research in the behavioral sciences and clinical psychiatry, or for the development of an individual investigative project under the supervision of a faculty sponsor.

PBSCI 525 P-Psychiatry and the Law (3) *Goldenberg* Concentration on major issues in psychiatry and law. Outside speakers from legal, judicial, and psychiatric communities. Lectures on assessment in forensic settings, competence to stand trial, and criminal responsibility. Discussions on personality disorders and correctional environments. For psychiatric residents and graduate psychology, psychosocial nursing, social work, and law students.

PBSCI 530 P-Developmental Psychoanalytic Psychotherapy (2) *Schimmelbusch* Examines how failures of psychological development lead to disorders of regulation of affects and cognition, and how psychoanalytic treatment reinstates normal development. Treatment process viewed from a psychoanalytic and psychobiological perspective. Clinical case discussion integrates theoretical concepts.

PBSCI 535 Modern Concepts of Psychoanalysis (2) *Schimmelbusch* Examines childhood developmental stages in light of inborn and environmental determinants. Correlates developmental phases with adult personality functioning. Views emotional development from a psychoanalytic and psychobiological point of view. Clinical case discussion integrates theoretical concepts.

PBSCI 546 Psychosocial Epidemiology (3) *Vander Stoep* Application of epidemiological methods to the study of mental illnesses. Topics include occurrence and distribution of mental illness, classification of psychiatric disorders; treatment-based vs. community-based studies; epidemiology of depression and schizophrenia; familial transmission; developmental epidemiology; mental illness and violence. Prerequisite: one course in epidemiology or permission of instructor. Offered: jointly with EPI 546; Sp.

PBSCI 548 P-Aging and Adult Development (1-3, max. 3) Aging in Western technologically advanced societies frequently involves losses in status, stamina, and economic and social supports. Consideration given to losses among the aged. Students select projects in the area of aging and work at their own levels of expertise and sophistication. Seminar format with guided reading.

PBSCI 560 P-Psychological Interventions for Primary Care Physicians (1) *Kent* Focuses on the integration of primary care and mental health issues. Reading, lectures, videos, and role plays are utilized to review evidenced-based psychological interventions which can be employed in an outpatient primary care setting. Emphasizes issues of somatization, depression, anxiety, and health behavior change.

PBSCI 591 P-Seminars and Conferences in Psychiatry: Seminar in Clinical Neuropsychology (*) Introduction to neuropsychological studies of brain-behavior relationships. Exposure to neuropsychological assessment procedures and manifestation of neurocognitive deficits in selected mental and medical disorders, e.g., epilepsy, AIDS, sleep disorders, trauma, toxin exposure, vascular disorders, psychiatric disorders. Develop knowledge of neuropsychological assessment procedures and applications

to diverse medical conditions. Prerequisite: psychological assessment experience.

PBSCI 600 Research in Psychiatry (1-15, max. 15) *GE* Independent laboratory research under the guidance and supervision of research scientists in the Psychiatry Department. Faculty permission required. Offered: .

PBSCI 630 P-WRITE Psychiatry Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

PBSCI 665 P-Basic Clinical Clerkship (12) *Dagadakis, McCreery, Mehta* Inpatient clerkship in psychiatry. Students have primary responsibility under the direction of attending psychiatrists and residents for diagnosis and care of patients at University of Washington Medical Center, Harborview Medical Center, or Veterans Administration Hospital. Emergency room, crisis intervention, consultation to patients with psychiatric dysfunction. Familiarity with psychopharmacology and short-term hospitalization emphasized. (Six weeks, full-time.).

PBSCI 666 P-WWAMI Psychiatry and Behavioral Sciences Clerkship (12) *Kletti* Rotation aims to increase student's skills in basic psychiatry, social psychiatry, transcultural psychiatry, and community psychiatry. Orientation is around the diagnosis, treatment, and clinical management of White, Aleut, Indian, and Eskimo children and adults in outpatient, inpatient, and community settings. Third-, fourth-year medical students. Prerequisite: HUBIO 563. (Limit: three students.).

PBSCI 667 P-Basic Psychiatry Clerkship, Boise (12) *Hines* Basic psychiatry clerkship at Veterans Administration Medical Center in Boise, Idaho. Fulfills graduation requirement for clerkship in Psychiatry.

PBSCI 668 P-Psychiatry Clerkship, Spokane (12) *Bakker* Students work on adult, geriatric, and adolescent inpatient psychiatric units of Sacred Heart Medical Center, following patients after transfer to partial hospitalization or outpatient clinic. Didactics include basic psychiatric diagnosis, treatment, and pharmacotherapy. Prerequisite: completion of HUBIO series; third and fourth-year medical students.

PBSCI 669 Basic Psychiatry Clerkship, Wyoming (12) Students work in the Wyoming Behavioral Institute with adult, adolescent, and child inpatients. Students have some outpatient experience and emergent care assessment experience at the Wyoming Medical Center. Didactics and discussion include topics such as psychopharmacology, emergent care and assessment, diagnosis, and substance abuse issues.

PBSCI 670 P-Clerkship in Consultation/Liaison Psychiatry UWMC (*, max. 24) *Walker* Assessment of patients with major psychosocial problems associated with physical disease, including: problems stemming from the way the illness is perceived and experienced, liaison with other clinical disciplines on complex diagnosis and treatment of problems. (Limit: one student; four weeks.) Prerequisite: HUBIO 563; either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 671 P-Clerkship in Consultation/Liaison Psychiatry HMC (*, max. 24) *Elliott*
Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Limit: two students.).

PBSCI 672 P-Selective Clerkship in Primary Care Psychiatry at Boise VAMC (8/12) *Blackburn, Leone, Marsh*
Assessment and treatment of patients with acute psychiatric problems in a primary care/rural setting. Consultation work on general medicine and surgery; assessment and dealing with outpatient psychiatric problems as they initially present. Evaluations, crisis intervention strategies, and brief therapies stressed. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks; UW students only.).

PBSCI 673 P-Outpatient Psychiatry Elective (*, max. 24) *Foster*
Offered at Harborview Outpatient Center. Students function as subinterns, conducting diagnostic interviews, initiating and managing pharmacotherapeutic treatment regimens, and providing crisis intervention, under the supervision of the full-time attending at Psychopharmacology Clinic. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.).

PBSCI 676 P-Inpatient Clerkship in Psychiatry at American Lake VA (8/12) *Chandran*
For medical students with a defined interest in psychiatry who wish to develop their knowledge and skills in the evaluation, management, and treatment of a wide range of acute and chronic psychiatric conditions requiring inpatient hospital treatment. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.).

PBSCI 677 P-Alcohol and Drug Treatment Clerkship at American Lake VA (8/12) *Lim*
Student assists in every phase of the substance-abuse treatment, including admission interviews, patient evaluation, problem identification, group and individual psychotherapy, assertiveness training, anger control, human sexuality, medical evaluation and treatment, couples therapy, discharge and aftercare planning. Experience primarily clinical. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four to six weeks, full-time.).

PBSCI 678 P-Clerkship in Psychiatric Long-Term Care and Rehabilitation (*, max. 12) *Chandran*
Two- to six-week clerkship provides learning experiences in rehabilitation of long-term psychiatric patients with medical illness. Multidisciplinary team approach, working with homeless mentally ill. Diagnostic skills emphasized. Spectrum of diseases (cardiovascular, Huntington's, organic brain syndrome) is such that physical rehabilitation is not an emphasis. Prerequisite: HUBIO 563; either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 680 P-Clerkship in Emergency Psychiatry (*, max. 24) *Gardiner*
Emphasis on clinical evaluation, acute management, and treatment planning for individual patients. Experience in coordinating these activities with other emergency room personnel, and various hospital and community resources. Emphasis on skills useful to physicians in any specialty. Third- and fourth-year medical students only. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time.).

PBSCI 685 P-Geriatric Psychiatry Clerkship (*, max. 12) *Pascualy*
Two- to six-week elective (four weeks highly recommended). Participation in the evaluation and care of older persons with psychopathology, such as intellectual impairment and depression, in a variety of settings. Emphasis on improving clinical skills regarding diagnosis and treatment of common behavioral problems in the elderly. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668.

PBSCI 688 P-Subinternship in General Psychiatry (*, max. 16)
Students function as interns under the supervision of house staff and attending psychiatrists. Further development of their diagnostic and therapeutic skills emphasized. Special areas of interest, such as family intervention, substance abuse, psychoses, neuropsychiatry, community psychiatry, administration, research pursued. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668; permission of instructor. (Four or six weeks, full-time.).

PBSCI 696 P-Advanced Clerkship in Child Psychiatry (*, max. 24) *Varley*
Provides students an opportunity to participate in evaluation and treatment. Experiences in specialized clinics are also available. It is suggested that the student contact the instructor prior to enrollment. Prerequisite: either PBSCI 665, PBSCI 666, PBSCI 667, or PBSCI 668. (Four or six weeks, full-time. Limit: two students.).

PBSCI 697 P-Psychiatry Special Electives (*, max. 24)
By special arrangement, clerkships, externships, and research opportunities can be made available at the University and other institutions. Students obtain permission from Dr. Hunt before obtaining a special assignment form from the Dean's office one month before advance registration. Students contact affiliating institutions. Does not fulfill the requirement for a basic clerkship in psychiatry.

PBSCI 699 P-WWAMI Psychiatry and Behavioral Sciences Special Electives (*, max. 24)
By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Radiation Oncology

R ONC 499 Undergraduate Research (*, max. 24) *Austin-Seymour, Cho, Douglas, Einck, Kalet, Koh, Laramore, Lindsley, Ling, Phillips, Rasey, Russell, Schwartz, Stelzer, Wilbur, Yas*
Opportunities in clinical or laboratory investigation in radiation oncology, radiation physics, or computer-related research. Student participation in ongoing or new projects. Open to students in the biological or physical sciences.

R ONC 695 P-Clinical Cancer Management (*, max. 8) *Koh*
Participation in the clinical management of patients with cancer, emphasizing a multi-modality approach. Includes clinical assessment, planning of radiation treatment, and follow-up evaluation of patients. Special procedures include three-dimensional treatment planning, implant brachytherapy and intraoperative radiation. Daily teaching conferences with faculty and residents. Prerequisite: MED 665 or permission of instructor.

R ONC 697 P-Radiation Oncology Special

Elective (*, max. 24) *Koh*
By specific arrangement for qualified students, special clerkship, externship or research opportunities can be made at institutions other than the University of Washington. Students should obtain a "Special Assignment" form from the Dean's Office at least one month before advance registration. Prerequisite: permission of instructor.

R ONC 699 P-WWAMI Radiation Oncology Special Electives (*, max. 24)
By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Radiology

RADGY 498 Undergraduate Thesis(*)
Supervised clinical and/or laboratory research in the broad field of medical imaging, culminating in a thesis. Offered: AWSpS.

RADGY 499 Undergraduate Research (*)
Opportunity to gain research experience and direct participation in either clinical or basic sciences investigation in diagnostic and/or nuclear medicine. Offered: AWSpS.

RADGY 505 P-Preceptorship in Nuclear Medicine (1, max. 24) *Eary (University of Washington Medical Center)*
Opportunity for first- and second-year medical students to gain experience with faculty in clinical and academic environments. Students observe general aspects of the Nuclear Medicine Division, including clinical problems, the different relationships in the clinic between physician and patient, and several research aspects of the division. Prerequisite: permission of instructor. Offered: AWSpS.

RADGY 508 Physical Aspects of Medical Imaging (4) *Stewart*
Quantitative physical principles of medical imaging are presented for electromagnetic and sonic radiation. Methods of image formation and analysis are discussed for conventional film radiography, CT, DSA, PET, B-mode ultrasound and Doppler ultrasound. Offered: jointly with BIOEN 508/ENV H 528.

RADGY 550 Nuclear Magnetic Resonance in Biomedicine (2) *Hayes, Kushmerick, Richards, Yuan*
Basic physics of nuclear magnetic resonance (NMR) imaging and spectroscopy are presented. Research applications of NMR in physiology and biochemistry are reviewed with emphasis on the brain. Grade based on written tests and small research paper. Prerequisite: permission of instructor. Offered: jointly with BIOEN 565; odd years; Sp.

RADGY 580 P-Nuclear Medicine Technique, Physics, and Instrumentation (2.5) *Lewellen*
Provides familiarization with basic nuclear phenomena and with the instrumentation used in the practice of nuclear medicine. There are discussions and laboratory exercises. Practical experience in instrument operation and sample counting are provided. Prerequisite: permission of instructor. Offered: S.

RADGY 693 P-Introduction to Diagnostic Radiology (4) *Schulte*
Half-time clerkship in the field of medical imaging. Lectures, case discussions, film reading, and independent study provide an overview of the subspecialty areas of diagnostic radiology and nuclear medicine. Emphasis on utilization and selection of imaging tests, radiologic anatomy, and interpretation of

commonly encountered studies. Offered: AWSpS.

RADGY 694 P-Advanced Clinical Clerkship (8) *Schulte* Full-time clerkship provides a more in depth experience in diagnostic radiology and nuclear medicine. Required rotations in the subspecialty areas of radiology augment the basic lecture series and case discussions of Radiology 693. For those with a special interest in diagnostic radiology. Prerequisite: permission of instructor and departmental education coordinator. Offered: AWSpS.

RADGY 695 P-Radiology Sub-specialty Elective (*, max. 8) *Schulte* Clinical rotation in one of the sub-specialty areas of radiology at the University of Washington and affiliated hospitals. Requires special arrangements and permission from a preceptor and the education coordinator in Radiology. Two or four weeks. Offered: AWSpS.

RADGY 696 P-Nuclear Medicine Clerkship (*, max. 12) *Eary* Daily participation at University of Washington Medical Center nuclear medicine clinic emphasizing technical performance, diagnostic interpretation, and clinical relevance of nuclear imaging. Daily clinical teaching conferences of the division. Four- and six-week clerkships can be preplanned in areas such as pulmonary, cardiovascular, renal, bone, computer analysis. Prerequisite: permission of instructor. Offered: AWSpS.

RADGY 697 P-Radiology Special Electives (*, max. 24) *Schulte* Radiologic training in a nonaffiliated institution. Permission and arrangements must be made at the time of registration through direct communication between the student and the education coordinator in Radiology. A written outline from a preceptor at the intended site required. Prerequisite: permission of radiology education coordinator. Offered: AWSpS.

RADGY 699 P-WWAMI Radiology Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Rehabilitation Medicine

REHAB 300 Introduction to Occupational Therapy (1) Introduction to occupational therapy profession. Provides historical perspectives, theoretical foundations, and clinical case studies in various practice arenas. Credit/no credit only. Offered: ASP.

REHAB 340 Spinal Orthotics (5) *Yamane* Instruction and review of anatomy and biomechanics of the spine, patient evaluation, and prescription considerations as related to spinal orthotics. Lectures provide background knowledge of orthotic treatment principles for spinal pathologies. Laboratory experience includes patient evaluation, impression and measurement techniques, fabrication methods, and fitting criteria. Required for prosthetics and orthotics majors.

REHAB 341 Upper Extremity Prosthetics I (4) *Okumura* Principles of upper extremity prosthetic management and prescription considerations: functional evaluation, preprosthetic care, use of prosthetic components and materials, fabrication,

harnessing, prosthetic training, documentation, and billing. Incorporates anatomy, biomechanics, and pathomechanics with clinical experience as they pertain to upper extremity prosthetics. Required for prosthetics and orthotics majors.

REHAB 342 Upper Extremity Prosthetics II (4) *Okumura* Principles of upper extremity prosthetic management and prescription considerations: functional evaluation, preprosthetic care, use of prosthetic components and materials, fabrication, harnessing, prosthetic training, documentation, and billing. Incorporates anatomy, biomechanics, and pathomechanics as they pertain to upper extremity prosthetics. Required for prosthetics and orthotics majors. Prerequisite: REHAB 341.

REHAB 343 Upper Extremity Orthotics (2-4, max. 4) *Yamane* Lecture and laboratory instruction in patient evaluation, prescription considerations, componentry, and fabrication procedures for upper extremity orthoses. Required for prosthetics and orthotics majors.

REHAB 400 Medical Science (4) *Greenberg, Jirlikowic* Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

REHAB 401 Medical Science (4) *Abrahamson, Greenberg* Lectures in fields related to: general surgery, obstetrics and gynecology, internal medicine, neurology, rehabilitation medicine, orthopaedics, psychiatry and behavioral sciences, rheumatology, and pediatrics. Required for occupational therapy, prosthetics and orthotics, and physical therapy students. Credit/no credit only.

REHAB 402 Medical Science Laboratory (1, max. 2) To introduce students to the role of allied health professionals in the treatment of pathologies presented in 400, 401 lectures. Credit/no credit only.

REHAB 403 Exercise Physiology for Rehabilitation Professionals (2) *Anderson, Slimp* Normal and pathological physiology of the cardiovascular, respiratory, and musculoskeletal systems as a basis for evaluation and intervention in occupational therapy, physical therapy, and prosthetics/orthotics. Required for majors.

REHAB 413 Special Studies in Physical Therapy (1-15, max. 24) Theory and practice in specialized areas of physical therapy. Credit/no credit only.

REHAB 414 Psychological Aspects of Rehabilitation (2) *I&S Patterson* Psychological processes underlying adjustment to disability; application of behavioral/analysis systems in patient therapy management; effects of cognitive or personality deficits on patient performance and treatment strategies. Credit/no credit only.

REHAB 416 Principles of Physical Therapy Administration (2, max. 4) *Guthrie* The nature of administration, economic trends, operational policy, aspects of supervision, ethical and legal influences applicable to a physical therapy department. Required for physical therapy students. Credit/no credit only.

REHAB 420 Lower Extremity Prosthetics I (8) *Abrahamson* Instruction in patient evaluation,

casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation for transtibial amputation. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 421 Lower Extremity Prosthetics II (11) *Abrahamson* Instruction in transfemoral patient evaluation, casting, cast modification, socket fabrication, static and dynamic alignment, alignment duplication, suspension systems, and documentation. Methods of fitting through knee and hip disarticulation levels demonstrated. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 423 Lower Extremity Orthotics I (6) *Yamane* Patient evaluation and prescription considerations for orthotic management of the lower extremity. Lectures provide instruction in the biomechanics of the lower extremity during ambulation, clinical indications and fitting criteria for a variety of orthotic devices. Laboratory sessions provide experience in fabrication principles, and impression and measurement techniques. Required for prosthetics and orthotics majors.

REHAB 424 Lower Extremity Orthotics II (8) *Yamane* Orthotic treatment of pathological conditions that affect the knee and hip addressed. Focus is placed on development of prescription recommendation, fabrication, fitting, and follow-up of orthoses that support, assist, or stabilize the knee and hip. Required for prosthetics and orthotics majors; others by permission of instructor.

REHAB 427 Applied Prosthetics and Orthotics I (1-, max. 4) *Hafner* Presentation and discussion of current clinical practice using research and journal articles and case presentations. Required for prosthetics and orthotics majors; others by permission of instructor. Credit/no credit only.

REHAB 428 Applied Prosthetics and Orthotics II (1-4, max. 13) Experience in patient management under the preceptorship of certified practitioners at clinical affiliation sites. Required for prosthetics and orthotics majors.

REHAB 429 Immediate Post-Operative and Early Fitting (2) *Hafner* Lecture and laboratory designed to introduce the student to the principles of immediate postsurgical prosthetic fitting, including patient management. .

REHAB 430 Engineering Concepts (2) @ *Okumura* Principles of mechanics and strength of materials, force analysis, and hydraulic control in relationship to orthotics and prosthetics design. Required for prosthetics and orthotics majors.

REHAB 442 Applied Kinesiology (4) *Guthrie, Shumway-Cook* Study of joint motion and muscle function in relation to both the normal and abnormal state, emphasizing gait. Specific techniques employed in the field of rehabilitation medicine are analyzed. Required for Department of Rehabilitation Medicine students; others by permission.

REHAB 444 Functional Musculoskeletal Anatomy (4-) *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

REHAB 445 Functional Musculoskeletal Anatomy (-4) *Guthrie* Functions of musculoskeletal system as applied to patterns of motion. Anatomy of peripheral-vascular and peripheral-nervous system. Required for occupational therapy students, prosthetics and orthotics students, and physical therapy students; others by permission of instructor.

REHAB 448 Applied Kinesiology Laboratory (1) *Abrahamson, Guthrie, Okumura, Powell, Robinson, Rollinger* Instruction and laboratory focus on practical experience and clinical problem solving in kinesiology. Potential topics include muscle and joint motion testing, sensory/perceptual assessment, prosthetic and orthotic devices, wheelchair use, gait training.

REHAB 451 Functional Anatomy Laboratory (1) *Bennett, Rollinger* Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

REHAB 452 Functional Anatomy Laboratory (1) *Bennett, Rollinger* Study of musculoskeletal, peripheral-vascular, and peripheral-nervous systems from prosected material. Required for physical therapy, occupational therapy, and prosthetic/orthotic students.

REHAB 458 Augmentative and Alternative Communication: Implementation Strategies (2-3) *NW* Communication needs of nonspeaking individuals. Interdisciplinary approaches to the evaluation, selection, and implementation of aided and unaided communication augmentation systems. Recommended: basic course work in either SPHSC, OT, PT, or ENGR. Offered: jointly with SPHSC 453.

REHAB 459 Augmentative and Alternative Communication: Access for Technology (3) *NW* Communication technology and motor evaluation of augmentative and alternative users. Issues related to hardware, software, switch placement and access, with opportunities for clinical trials. Recommended: SPHSC 453 or REHAB 458. Offered: jointly with SPHSC 454.

REHAB 476 Prosthetic and Orthotic Evaluation and Use (2) *Okumura* Instruction in mechanical component substitution for functional losses. Emphasis is on biomechanical principles, prosthetic-orthotic components, and alignment and fitting techniques. Credit/no credit only. Required for physical therapy students.

REHAB 496 Special Topics in Rehabilitation (1-9, max. 14) Guided opportunity for in-depth study in specific areas of rehabilitation. Topics vary.

REHAB 498 Undergraduate Thesis (*) .

REHAB 499 Undergraduate Research (*) Opportunity to design, perform, and analyze research investigation in problem areas in rehabilitation medicine. These include clinical and basic research problems in, for example, head and spinal injury, chronic disease, pain neurophysiology, electrodiagnosis, communication, and bioengineering.

REHAB 502 Lifespan II: Pediatrics (2-3, Max. 5) *Kartin, Mullens, Washington* Provides an overview of pediatric physical therapy practices for children with atypical development. Assessment, development of physical therapy plans of care for children with various disabilities

will be presented within the frameworks of family-centered-care and disablement models. .

REHAB 503 Lifespan III: Geriatric Physical Therapy (3) *Shumway-Cook* Theory and principles of exercise procedures used when treating the geriatric patient. Includes a discussion of age related changes in the systems essential to movement control; factors contributing to physical disability and frailty with aging; adaptation of assessment and treatment procedures to the geriatric patient. Lectures and laboratories.

REHAB 505 Introduction to Pharmacology (2) *Guthrie* Pharmacological survey of drugs commonly prescribed for clients seen in a physical therapy practice setting. Presentations on basic principles. Additional data search and group reports. Overview of medical emergencies. Credit/no credit only.

REHAB 506 Physical Therapy Procedures II: Assessment (2) *Robinson* Development of clinical competence in patient assessment techniques from a neuromusculoskeletal perspective. Discussion of normal and pathological findings. Special emphasis on lower quadrant anatomy, posture evaluation, and medical record documentation skills. Lecture and laboratory format.

REHAB 507 Physical Therapy Procedures III: Modalities (3-4) *McGough* Principles and practice of physical therapy clinical treatment procedures utilizing therapeutic modalities. Lecture and laboratory format.

REHAB 510 Rehabilitation Psychology (2) *Jensen* Processes and management methods for assimilation of disability, enhancing patient participation in rehabilitation process, and for helping in maintenance of performance; behavioral management and case conference strategies; rehearsal of contingency management techniques. Required for residents; others by permission of instructor.

REHAB 511 Musculoskeletal IV: Clinical Management (5) Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on upper quadrant anatomy. Lecture and laboratory format.

REHAB 512 Musculoskeletal V: Clinical Management (4) Physical therapy clinical evaluation and management of patients with musculoskeletal dysfunction. Special emphasis on lower quadrant anatomy. Lecture and laboratory format.

REHAB 513 Special Studies in Physical Therapy (1-5, max. 15) Theory and practice in specialized areas of physical therapy. Includes organization and administration of specialized programs, advanced evaluation and treatment techniques, role of the consultant. Credit/no credit only.

REHAB 516 Medical Information for Rehabilitation Counselors (3) *Johnson* Lectures in medical science field regarding the etiology, prognosis, and physical restoration of common disabling conditions. Case studies are used extensively, and major emphasis is placed on vocational implications of physical disability. Prerequisite: permission of instructor.

REHAB 517 Physical Therapy Seminar (2-3, max. 21) *Kartin* Group seminar format focused

on physical therapy topics pertaining to transcultural and professional practice issues. Credit/no credit only.

REHAB 518 Infants and Young Children: Current Research (3) *Deitz, Swanson* Introduces students to recent research relating to assessment and intervention with infants and young children who are "at risk" or who are disabled. Critical evaluation of the current research emphasized. Prerequisite: clinical experience or coursework related to infants and young children with disabilities and permission of instructors.

REHAB 519 P-Preceptorship in Rehab Medicine (1) Explores the field of physical medicine and rehabilitation. Students observe a physiatrist one half day each week, and gain understanding of the management of acute injuries, chronic disease, and disabilities. Offered: AWSpS.

REHAB 520 Seminar (1-5, max. 5) Conferences, seminars, discussions of advanced physical medicine and rehabilitation topics for graduate students, residents and postdoctoral fellows in rehabilitation medicine. Lectures, discussion, and laboratory work in selected aspects appropriate to elected area of study for applicants for master-level degree.

REHAB 522 Neurophysiological Topics in Rehabilitation Medicine (2) *Anderson* Review of traditional neurophysiological concepts and an exposition of recent advances in neurophysiological research related to the practice of rehabilitation medicine. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

REHAB 523 Neuroscience III: Applied Neurology (4) *Shumway-Cook* Theory and principles of advanced exercise procedures used when treating patients with neurologic pathology. Includes the application of principles of motor learning and control; facilitation and inhibition of variables affecting functional motor performance; adaptation of assessment and treatment procedures to patients with different types of neurologic impairments. Lectures and laboratories.

REHAB 527 Neuroscience IV: Physical Rehabilitation of Adult Neurological Disorders (2) *Kelly* Critical analysis and application of physical therapy assessment and treatment techniques to problems related to specific adult neurological disorders. Neurological disorders to be covered include stroke, spinal cord injury, traumatic brain injury, and multiple sclerosis.

REHAB 528 International Clinical Clerkship (2) Short-term clinical education experience outside the United States. Participants work in a mentored relationship as part of a multidisciplinary rehabilitation team providing direct clinical services and consultation to patients and their care-givers. Sponsored sites selected and screened by Clinical Coordinator. Students may choose area of clinical focus. Credit/no credit only.

REHAB 529 Professional and Practice Issues in Physical Therapy (2) *Guthrie* Augments the student's understanding of the profession and current issues in healthcare. Includes healthcare delivery, scope of practice, professional organization, political activism, specialist certification, licensure, collaboration, therapeutic relationships, disclosure, privacy, and informed consent. Credit/no credit only.

REHAB 530 Medical Aspects of Vocational Counseling (2-3) *Johnson* Introduction to vocational implications of physical and emotional disabilities. Methods, counseling techniques, therapeutic modalities, community resources used in producing vocational assistance for persons with disabilities. Prerequisite: resident standing in rehabilitation medicine or permission of instructor.

REHAB 532 Clinical Affiliation for Rehabilitation Counselors (5-6) *Johnson* Under preceptorship of rehabilitation counseling staff, students counsel and evaluate patients with severe physical, emotional, or social problems; administer vocational testing; obtain placement on job stations; work with community resources for vocational/educational placement; and develop activity-oriented schedules. Prerequisite: permission of instructor.

REHAB 536 Patient Evaluation and Clinical Decision Making (1-2, max 8) *McGough, Robinson* General principles and practice of physical therapy patient evaluation and use of the clinical decision-making models. The application of patient management principles through examination techniques and documentation strategies. Lecture and laboratory format.

REHAB 537 Functional Mobility Skills (2) *McGough, Robinson* Principles and practice of physical therapy interventions related to functional mobility skills, including transfer training, wheelchair fitting, wheelchair mobility, gait training, and caregiver training.. Lecture and laboratory format.

REHAB 538 Integumentary, Edema Management, and Circulatory Screening for PT (2) *McGough, Robinson* Principles and practice of physical therapy evaluation and interventions related to wound care, burn care, edema management, circulatory screening, and splinting applications. Lecture and laboratory format.

REHAB 539 Communication Disorders in Rehabilitation Medicine (1) *Yorkston* Overview of communication disorders secondary to central and peripheral nervous system impairment. Emphasis on facilitating identification of speech/language disorders with discussion of implications for rehabilitation. .

REHAB 540 Acute Care Practice in Physical Therapy (2) *Robinson* Principles and practice of physical therapy evaluation and interventions related to individuals with diagnoses in the recent onset (or acute) stage of development.

REHAB 544 Functional Anatomy for Physiatrists (2-) *Goldstein* Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro/musculo/skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 545 Functional Anatomy for Physiatrists (-2) *Goldstein* Lectures and demonstrations to illustrate functional anatomy as applied by physicians in the practice of clinical rehabilitation. Intended to enhance functional assessments and to improve neuro/musculo/skeletal diagnosis and treatment through greater understanding of the underlying anatomy. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 546 Teaching Practicum in Occupational and Physical Therapy (1-3, max. 3) Integration of knowledge and skills in teaching through teaching in the classroom or presentation of a minicourse, workshop, or in-service training series. Prerequisite: MEDED 520 and permission of instructor.

REHAB 550 Neuropsychology in Rehabilitation (2) *Bobardier, Ehde* Examination and management of patients with brain lesions, as well as an understanding of the consequences of such conditions. Prerequisite: graduate standing in rehabilitation medicine.

REHAB 555 P-Neuromuscular Electrodiagnosis (2.5) *Kraft* Demonstration of fundamentals of electromyography and peripheral nerve stimulation followed by participation in clinical electrodiagnosis examinations. Develops awareness of knowing when such procedures are indicated for patients and interpreting results rather than developing proficiency in performing these examinations. Prerequisite: HUBIO 560 and permission of instructor.

REHAB 565 Assistive Technology in Rehabilitation and School System Practice (3) Introduction to the use of assistive technology in rehabilitation and special education. Content includes set-up and use of alternative input systems on microcomputers and applications of technology to neuromuscular retraining, augmentative communication, and facilitation of learning in the classroom. Prerequisite: familiarity with basic computer operations and permission of instructor.

REHAB 566 Special Topics in Rehabilitation (1-9, max. 14) Philosophy and concepts in the interdisciplinary rehabilitation of persons with major disabilities, including advanced content in the rehabilitation theory and process of selected categories.

REHAB 567 Practicum in Rehabilitation (1-12, max. 24) Specialized practicum experience in environment providing rehabilitation services. Practicum arrangements and permission by instructor.

REHAB 568 Biophysics as Applied to Physical Medicine (2) *Esselman* Propagation and absorption characteristics of physical forms of energy used for treatment in physical medicine. Physiologic effects basic to prescription of the physical therapy modalities. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 570 Foundations of Occupational Therapy (5) *Powell* An overview of the practice of occupational therapy, emphasizing the role of occupational performance in context, frames of reference, clinical reasoning, and purposeful activity. Introduces the diversity of occupational therapy practice environments through didactic and clinical experiences. Offered: A.

REHAB 571 Occupational Performance through the Life Span (4) Overview of human development as it relates to occupational performance and functional adaptation in the ages and stages of life from infancy through old-old age. Emphasis will be placed on environmental influences, activity, and occupational roles, tasks, and component behaviors as they relate to individuals in different ages and stages. Offered: W.

REHAB 572 Occupational Therapy Theory and Practice in Psychosocial Dysfunction I (5) *Engel-Knowles* An overview of bodies of knowledge in psychosocial practice as related to occupational performance. Learning topics include major frames of reference, effects of psychosocial disorders on occupational performance (life activities), and occupational therapy evaluation and intervention skills. Lectures, reading, class discussions, role-playing, problem-based learning, and fieldwork comprise the learning experiences. Offered: S.

REHAB 573 Occupational Therapy in Community Practice (4) *Engel-Knowles* Bodies of knowledge in occupational performance as they relate to the emerging area of community-based practice. Includes traditional and evidence based practice in the realms of health promotion, prevention, evaluation, and intervention. Lectures, assigned readings, class discussions, role playing, site visits, films, laboratory exercises, and problem-based learning tutorials. Offered: Sp.

REHAB 574 Occupational Therapy Theory and Practice in Physical Disabilities I (6) *Dudgeon* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: A.

REHAB 575 Occupational Therapy Theory and Practice in Physical Disabilities II (5) *Powell* Provides theoretical bases and clinical practice skills used in evaluation and intervention of occupational performance (life activities). Focus is on individuals with sensorimotor (physical) and/or cognitive impairments. Practical applications of theory occur through lecture, laboratory, and problem-based learning approaches. Offered: W.

REHAB 576 Occupational Therapy Theory and Practice in Pediatrics (1-7, max. 7) *Dietz* Provides knowledge and skills necessary for providing occupational therapy evaluation, intervention, and transition services focused on occupational performance (life activities) for children and teens with disabilities and their families. Offered: W.

REHAB 577 Occupational Therapy Theory and Practice in Geriatrics (5) *Powell* Occupational therapy evaluation and intervention with older adults. Covers psychology, physiology, and socio-demographics of aging. Emphasis on interaction skills with the elderly and occupational performance (life activities). Laboratory experiences and fieldwork in the practice setting enhance didactic coursework. Offered: Sp.

REHAB 578 Occupational Performance Analysis (3) *Dudgeon* Skills in the analysis, adaptation, and sequencing of therapeutic and functional activities as they apply to occupational performance. Analysis focuses on performance components (sensorimotor, cognitive, psychosocial, psychosocial, psychological), temporal aspects (chronological, developmental), and environmental aspects (physical, social, cultural). Offered: S.

REHAB 579 Therapeutic Communication (3) *Kanny* Introduces basic principles and skills of effective interpersonal communication in dyadic interactions and in groups. Emphasis on effective

listening, interviewing, and principles and concepts of occupational therapy groups. Lectures, readings, class discussions, role playing, and in-class exercises comprise the learning experiences. Offered: Sp.

REHAB 580 Introduction to Research in Rehabilitation (3) *Deitz* Evaluation of rehabilitation research literature and design of research studies relevant to rehabilitation. Offered: S.

REHAB 581 Application of Measurement Systems (3) *Deitz* Provides basis for critically evaluating and using tests and measurements in occupational therapy evaluation. Focus on reliability, validity, norms, test development process, statistics relevant to tests and measurement, and ethical implications of testing. Critical evaluation of selected standardized test used in occupational therapy. Offered: A.

REHAB 582 Assistive Technology in Rehabilitation (3) *Dudgeon* Overview of the field of assistive technology as it impacts occupational performance in self-care, work, and leisure activities. Covers interface devices, computer applications, environmental controls, augmentative communications, power mobility, seating and positioning systems, and sensory enhancements. Offered: W.

REHAB 584 Health-Care Trends and Issues (3) *Kanny* Overview of the health services system in the United States and current trends and issues facing occupational therapists within this system. Content includes: health service providers, reimbursement of health care services, regulation, personnel and role delineation, and health policy and advocacy. Offered: A.

REHAB 585 Leadership: Administration and Management (4) *Kanny* Provides student with knowledge and skills needed for leadership positions in occupational therapy practice. Focuses on administration and management functions including strategic planning, program planning, marketing, fiscal management, program evaluation, and personnel management. Offered: W.

REHAB 587 Industrial Rehabilitation (3) *Dudgeon* Provides knowledge and skills related to vocational assessment and industrial rehabilitation for individuals with medical or psychosocial problems. Emphasizes worker characteristics, job analysis, and accommodation in business and industrial settings. Clinical simulation components provide applications to specific diagnostic, impairment, or disability conditions. Offered: Sp.

REHAB 591 Master's Project (1-4, max. 7) Graduate project focused on research, administration, education, practice, policy, or other scholarly or creative work. Required of graduate, entry-level occupational therapy and physical therapy students. Offered: AWSpS.

REHAB 592 Principles of Orthotic Use in Rehabilitation (2) *Chang* General principles and clinical applications of orthoses in patient management, with exposure to research issues in orthotic design.

REHAB 593 Principles of Prosthetic Use in Rehabilitation (1) *Czerwiecki* General principles of prevention of amputation, prosthetic design, biomechanics, and clinical applications of upper and lower extremity prostheses.

REHAB 594 Clinical Fieldwork in Occupa-

tional Therapy (10, max. 20) *Rollinger* Six months of supervised fieldwork education. Experience in delivering occupational therapy services to clients focusing on application of purposeful and meaningful occupation. Exposure to a variety of clients across the lifespan and in a variety of settings reflective of current practice in the profession. Credit/no credit only. Offered: AWSpS.

REHAB 595 Clinical Affiliation in Physical Therapy ([2-10]-, max. 30) *Robinson* Clinical practice of physical therapy techniques under supervision in community-based clinics. Credit/no credit only.

REHAB 596 Electromyography and Clinical Neurophysiology (4) *Kraft* Didactic course covering electromyography and clinical neurophysiology. First part covers basic neurophysiology and second covers electromyography, nerve conduction studies, somatosensory-evoked potentials, residual- and auditory-evoked potentials, single fiber EMG, late response, quantitative analysis, and macro EMG. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 597 Electromyography and Electrodiagnosis Laboratory (1-) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 598 Electromyography and Electrodiagnosis Laboratory (-1-) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 599 Electromyography and Electrodiagnosis Laboratory (-1) *Kraft* Elective work in clinical electromyography and other electrodiagnostic methods. Prerequisite: resident standing in rehabilitation medicine; others by permission of instructor.

REHAB 600 Independent Study or Research (*) Credit/no credit only.

REHAB 685 P-Chronic Disease and Disability (4) *Cox, Hays* Meets chronic-care requirement for medical students. Structured clinical experience on rehabilitation medicine services. Differences between acute and chronic medicine, identification of disability problems, and therapeutic techniques for removing disability. Hospitals are within University system, local area, and WWAMI area. Prerequisite: third-year medical student standing.

REHAB 686 P-Rehabilitation Medicine Clerkship — Pediatrics (8/12) *Hays, Jaffe, Massagli* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disabling pediatric disease. School planning, family counseling, community support services included. Four- or six-week package permits inpatient, outpatient, and consultation experience. Recommended for students contemplating pediatrics. Prerequisite: third-year medical student standing.

REHAB 687 P-Rehabilitation Medicine Clerkship (8/12) *Hays* Meets chronic-care requirement for medical students. Incorporates material of 685 and expands into disability problems. Four- or six-week package permits inpatient, outpatient, and consultation experi-

ence. Recommended for careers in family medicine, internal medicine, rheumatology, cardiology, neurology, geriatrics, orthopedic surgery, neurosurgery, and cardiovascular surgery. Prerequisite: third-year medical student standing.

REHAB 689 P-Spinal Cord Injury (8/12) *Little* Introduction to diagnosis, management, rehabilitation of patients with spinal-cord injuries. Interaction with rehabilitation team, psychiatrists, and subspecialists in urology, neurosurgery, and plastic surgery. Performance at subintern level expected. Veterans Administration Medical Center only. Prerequisite: MED 665, SURG 665.

REHAB 695 P-Rural Rehabilitation Medicine Clerkship (8) *Hays* Structured clinical experience in identification and treatment of disability problems in rural (nonmajor urban) communities. Satisfies chronic care/rehabilitation medical graduation requirements. Prerequisite: completion of at least six months of clinical clerkships, permission of instructor.

REHAB 697 P-Rehabilitation Medicine Special Elective (*, max. 24) Equivalent to 686, 687, or 688. Satisfies requirements in rehabilitation medicine/chronic care. Student arranges with another university, using the "Special Assignment Form." Students can qualify after review, similar experience at another university. Prerequisite: permission of instructor.

REHAB 699 P-WWAMI Rehabilitation Medicine Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

REHAB 700 Master's Thesis (*) Credit/no credit only.

Surgery

SURG 498 Undergraduate Thesis (*) *Langdale* Offered to those students who have engaged in undergraduate research in general surgery. (Full- or part-time.)

SURG 499 Undergraduate Research (*) *Langdale* Provides an opportunity to participate in ongoing research projects or carry out an independent research project under supervision of Department of Surgery faculty. Practical experience in experimental design and execution is provided under direct supervision of selected faculty members. (Full- or part-time.)

SURG 505 P-Preceptorship in Surgery (1) *Langdale* Opportunity for first- and second-year medical students to gain personal experience with clinical faculty members in the community. Students observe general aspects of private practice, including clinical problems seen; practice limitation; doctor-doctor, doctor-patient, and doctor-nurse relationships in the office and hospital. Prerequisite: permission of department.

SURG 600 Independent Study or Research (*) *Langdale* .

SURG 630 P-WRITE Surgery Clinical Clerkship (*, max. 24) Basic clinical clerkship for students enrolled in the WRITE Program. Prerequisite: completion of basic curriculum; third- and fourth-year students; acceptance in the WRITE program.

SURG 665 P-Clinical Clerkship (*, max. 12) *Langdale (Harborview Medical Center, Providence Medical Center, University of Washington Medical Center, Veterans Affairs Medical Center, Virginia Mason Medical Center)* Diagnosis and management of problems amenable to surgical therapy. Physiological basis of surgical care, differential diagnosis and decision making, and the basic principles of surgical management. Care of inpatients and outpatients, including participation in the operating rooms. Prerequisite: HUBIO 563. (Six weeks. Limit: twenty students.).

SURG 666 P-Clinical Clerkship Boise (12) Diagnosis and management of surgical problems. Physiological basis of surgical care, differential diagnosis and decision making, and basic principles of surgical management. Care of inpatients and outpatients, including participation in the operating rooms. Fulfills graduation requirement for Surgery. Prerequisite: completion of HUBIO series. (Six weeks. Limit: two students.).

SURG 667 P-Clinical Clerkship Spokane (12) Diagnosis and management of surgical problems. Physiological basis of surgical care, differential diagnosis and decision-making, and basic principles of surgical management. Care of inpatients and outpatients, including participation in the operating rooms. Fulfills graduation requirement for Surgery. Prerequisite: completion of HUBIO series.

SURG 680 Emergency Medicine Elective (8) Basics of emergency medicine, including the primary survey, secondary survey, and approach to the critically ill patient. Students supervised by emergency boarded staff physicians at Madigan Army Medical Center Emergency Department. Prerequisite: basic clerkship in medicine, surgery, obstetrics, or pediatrics.

SURG 681 P-Peripheral Vascular Disease (4/8, max. 8) *Clowes (Veterans Affairs Medical Center)* Peripheral arterial and venous problems, including methods of clinical evaluation; new diagnostic procedures; and the available methods of treatment. Patient workup, performance of diagnostic studies, and presentation of case material to the staff. Prerequisite: SURG 665, HUBIO 563. (Two or four weeks. Limit: one student.).

SURG 682 P-Clinical Burn Care (*, max. 12) *Heimbach (Harborview Medical Center)* Offered on the burn unit of Harborview Medical Center. Exposure to the care of patients with thermal injury, including management of severe metabolic and septic problems and opportunity to participate in surgical procedures. Exposure to plastic and reconstructive surgery. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.).

SURG 683 P-Pediatric Surgery Externship (8/12) *Tapper (Children's Hospital and Regional Medical Center)* Surgical conditions peculiar to the particular age group with a preponderance of congenital and neoplastic conditions that are amenable to surgical treatment. A reasonable background of knowledge in human embryology and genetics is recommended. Prerequisite: SURG 665. (Four or six weeks. Limit: two students.).

SURG 685 P-Cardiothoracic Surgery Externship (*, max. 12) *Verrier (University of Washington Medical Center)* Serve as subintern, participate in patient care while learning

cardiopulmonary hemodynamics of cardiac and thoracic surgery. Observe a wide variety of both cardiac and thoracic disease entities. Participate in the open-heart procedures in the operating room. Opportunity to gain additional understanding of physiology of cardiopulmonary bypass. (Four or six weeks. Limit: two students.).

SURG 686 P-Plastic Surgery Clerkship and Preceptorship (*, max. 12) *Vedder (University of Washington affiliated hospitals)* Introduces fundamental techniques and enhances knowledge of plastic surgery, wounds, trauma, burns, cancers, and pediatric and adult cosmetic and reconstructive surgery. Participate in all surgery-related activities. Prerequisite: SURG 665; MED 665. MS III only, two weeks, 4 credits, limit 2; MS III/MS IV four/six weeks (recommended), 8/12 credits, limit 4.

SURG 687 P-Transplantation Surgery Clerkship (8) *Perkins (University of Washington Medical Center)* Clerkship is in the University regional multi-organ transplantation center. Student participates fully in the care of all transplant patients, on twice daily multidisciplinary rounds, in pre-operative conference, and in the operating room and on the donor harvest team. Weekly didactic teaching sessions. Prerequisite: SURG 665 and MED 665. (Four weeks. Limit: two students.).

SURG 688 P-Subinternship in General Surgery (*, max. 16) *Langdale (Veterans Affairs Medical Center, Harborview Medical Center, Providence Medical Center, University of Washington Medical Center)* Offered on the general surgery wards of the University-affiliated hospitals. Diagnosis, preoperative care, and postoperative care; management of surgical emergencies, the ICU patient, and outpatient follow-up of discharged patients. Students function at the intern level under close supervision of the staff and house staff. Prerequisite: SURG 665. (Four or six weeks. Limit: six students.).

SURG 689 P-Community Surgery Clerkship (8) *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a group practice in a smaller city. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four weeks. Longview. Limit: one student. Coeur d'Alene. Limit: one student.).

SURG 690 P-Alaska Native Medical Center Surgery Sub-Internship (8/12) *Langdale* Designed to supplement basics learned in 665. Excellent opportunity to participate in general, thoracic, vascular, and plastic surgery in a specialized population of patients. Recommended for students entering primary care. Prerequisite: SURG 665 and permission of department. (Four or six weeks. Alaska Native Medical Center, Anchorage. Limit: one student.).

SURG 691 P-Surgical Intensive Care Unit Sub-Internship (8) *Langdale* Designed to augment experience gained in 665. Excellent opportunity to participate in the management of critically ill patients under the close supervision of the staff/house staff. Recommended for students entering surgery or primary care. Prerequisite: SURG 665. (Harborview Medical Center. Limit: two students. Veterans' Affairs Medical Center. Limit: one student.).

SURG 692 P-Ambulatory Surgery Clerkship (4) *Waldhausen* Rotation focuses on increasing

the student's ability as a primary care physician to recognize and form an initial plan of management for common surgical problems seen in the outpatient setting. Offered: AWSpS.

SURG 697 P-Surgery Special Electives (*, max. 24) *Langdale* Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month before preregistration. Prerequisite: SURG 665 and departmental permission. (Four, six, or twelve weeks.).

SURG 698 P-Clinical Clerkship Away (*, max. 24) Clerkship equivalent to SURG 665, at sites outside the Seattle metropolitan area.

SURG 699 P-WWAMI Surgery Special Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

Urology

UROL 498 Undergraduate Thesis (*) Provides an opportunity for medical students to write in the area of urology.

UROL 499 Undergraduate Research (*) The student participates in current urologic research projects under supervision of full-time staff. Certain specific problems may be elected by the student. Elective for medical students.

UROL 501 P-Urology Preceptorship (1) Individual experiences with one or more of the full-time department faculty members covering research, teaching, and patient care. Students observe activities in the clinic, hospital ward, operating room, and research laboratories. Prerequisite: first- or second-year medical student standing; permission of instructor.

UROL 675 P-Urology Preceptorship (*, max. 8) Student follows a private practice preceptor in all of his or her work. Becomes acquainted with the office management of urological problems. Prerequisite: UROL 680, HUBIO 562. (Two or four weeks.).

UROL 680 P-Urology Clerkship (*, max. 8) *Berger, Ellis, Grady, Krieger, Lange, Mayo, J. Miller, L. Miller, Mitchell, Penson, Porter, Takayama, Wessells* Full activities of clinical service. Basic principles of urology emphasized. Prerequisite: HUBIO 562. (Two or four weeks.).

UROL 681 P-Female Urology (4) *J. Miller, L. Miller* Observation of cases of lower urinary tract disorders specific to women, emphasizing behavioral management and multidisciplinary care. Ninety-five percent of cases observed are women. Not intended as the only exposure to urology for students considering urology as career choice. Prerequisite: third- or fourth-year standing and permission of instructor.

UROL 685 P-Urology Subinternship (*, max. 12) *Berger, Ellis, Grady, Krieger, Lange, Mayo, J. Miller, L. Miller, Mitchell, Penson, Porter, Takayama, Wessells* Subintern is responsible for patient workups and for preoperative and postoperative care and participates in the operating room. Prerequisite: MED 665 or

pediatrics basic clerkship, or permission of instructor.

UROL 690 P-Urology Specialties (*, max. 8)

For those who wish further exposure to a specific aspect of urology. Students can spend time with one attending at University of Washington Medical Center, Harborview Medical Center, Children's Hospital and Medical Center, or Veterans Administration Hospital studying oncology, infections, infertility, stone disease,

impotence, or other aspects of urology. Prerequisite: UROL 680 and permission of instructor.

UROL 697 P-Urology Special Electives (*, max. 24) Special clerkship, externship, or research opportunities can at times be made available at institutions other than the University of Washington. Students wishing to elect this course should obtain from the Dean's office a special assignment form at least one month

before preregistration. Prerequisite: permission of instructor. (Six or twelve weeks.).

UROL 699 P-WWAMI Urology Special

Electives (*, max. 24) By special arrangement for qualified students, special clerkships or externships may be available at institutions other than the University of Washington located within the WWAMI region. Prerequisite: permission of department.

School of Nursing

Nursing

NURS 200 Critical Approach to Women's Health (3)

Interdisciplinary examination of women's health from a critical social-political approach. Discusses issues of gender, race, class, heterosexism, etc. in relation to women's health policies.

NURS 201 Growth and Development Through the Life Span (5) I&S

Focuses on processes of human growth and development from prenatal life to old age. Emphasizes influence of growth and development on achievement of health, and how awareness of growth and development theory and research helps guide health promotional efforts directed toward persons of various ages and life styles. Open to nonmajors.

NURS 202 Difference and Identity on University Campus (5)

Allen Novels, autobiographies, films, and music are used to explore how American who are seen as white are characterized by people who are seen as non-white. Since many freshmen find campus life more socially diverse than their home communities, the focus is on young adults and college environments.

NURS 301 Clinical Applications of Anatomy and Physiology (3)

Application of anatomic and physiologic concepts to selected clinical phenomena. Focuses on integrated responses and functional health patterns. Exemplars of developmental and lifespan factors are identified. Includes experiential activities to enhance integration of content. Offered: AS.

NURS 303 Foundations of Professional Nursing (2-3)

Exploration of the profession of nursing, including past and present work of nurses, the experience of being ill and seeking health care, and the U.S. health care system. Offered: Sp.

NURS 304 Human Responses I (3)

Examines normal and pathophysiological responses to states of health and illness. Examines internal and external defense systems, balance and regulation of body systems, and integration of these concepts in the assessment and management of patient problems. Offered: A.

NURS 308 Human Responses II (3)

Examines normal and pathophysiological responses to states of health and illness. Examines internal and external defense systems, balance and regulation of body systems, and integration of these concepts in the assessment and management of patient problems. Offered: W.

NURS 309 Pharmacotherapeutics in Nursing Practice I (2-)

Emphasizes the principles of pharmacology, drug therapy, pharmacologic-therapeutic classes of drugs, clinically important prototype drugs, and drug information resources.

Nursing issues related to drug administration are also discussed. First of a 2-quarter sequence. Offered: A.

NURS 313 Introduction to Nursing Informatics (1)

Combines understanding of computers, information literacy, and nursing science into a field that assists health care professionals to provide quality care. Provides an introductory overview. Emphasizes development of computer skills and impact of informatics on the clinical arena. Credit/no credit only. Offered: WS.

NURS 404 Gerontological Nursing (2)

Focuses on theoretical and practical information about basic and complex concepts and issues relevant to the nursing care of older people across the continuum of care.

NURS 405 Care in Illness II (5)

Continuation of 401, further examining selected psychopathologic and pathophysiologic alterations in health of individuals in context of families across life span. Emphasizes assessing functioning in psychosocial, cultural, person-environment relationships, and health care resources to plan nursing strategies for acutely/chronically ill individuals of all ages.

NURS 407 Cultural Variation and Nursing Practice (3)

Analyzes the impact of cultural, social, and global factors on the health of multicultural and diverse groups at the individual, population, and systems levels. Students gain knowledge and skills to effectively respond to the health care needs of multicultural societies through non-discriminatory and culturally appropriate nursing care practice. Offered: Sp.

NURS 408 Nursing Care with Families in the Community (3)

Application of biopsychosocial and social environmental theories and assessments to diagnose alterations in health/mental health of families, small groups in community settings. Emphasizes interpersonal and clinical therapies; coordination of community resources, evaluating effectiveness of changes; characteristics of nursing care in home visiting.

NURS 410 Legal and Ethical Issues in Clinical Practice (3)

Identification of ethical and legal issues and the ensuing dilemmas relevant to the profession of nursing and nurses as health professionals and citizens. Selected problems and dilemmas affecting nurses, nursing, and the delivery of health care analyzed using specific moral-ethical perspectives. Offered: AW.

NURS 412 Health Care Systems (3)

Introduction to analysis of health care systems with emphasis on political economy of health, access and utilization, disparities in health, public and private health insurance and reimbursement issues. Comparison of U.S. and other national health care systems. Offered: Sp.

NURS 415 Nursing of Families: Childbearing and Childrearing (5)

Applies family concepts to nursing of childbearing and childrearing families. Focuses on family as context for care of individuals. Emphasizes use of physiological, psychological, developmental, cultural, and environmental theories for health promotion, disease prevention, and nursing therapeutics. Offered: AW.

NURS 417 Psychosocial Nursing in Health and Illness (3)

Examines psychosocial disorders/issues of life transitions from integrated perspective of biological, social sciences, nursing, and humanities. Emphasizes utilizing psychosocial nursing and interpersonal therapeutics for assessment, intervention, health promotion with individuals/families/groups at risk for experiencing psychosocial disorders. Prerequisite: NCLIN 418, which may be taken concurrently. Offered: AW.

NURS 430 Interpersonal Relationships in Nursing (3)

Theory, current research, and practice in communication to develop and maintain interpersonal relationships with clients and health care colleagues. Lecture/discussion and laboratory learning opportunities include concepts of relationship development and disorder, interpersonal and group therapeutic communication processes, health care interviewing, and social support.

NURS 445 Topics in Nursing (1-10, max. 10)

Guided survey and discussion of current literature on major topics in physiological nursing. Seminar/lecture with analysis and discussion of selected topics and readings. May have clinical component. Implications for nursing practice and health care emphasized.

NURS 450 Study Abroad Preparation: International Nursing in Context (1-,max 4)

Carr, Kennedy, Lindenberg, Muecke Introduction to the language (if other than English), history and culture of the host country, and examination of international health issues pertinent to the country. Required course for students taking a Study Abroad quarter. Course may be taken as distance learning. Offered: AWSpS.

NURS 466 Continuing Education in Nursing (3)

Planning, developing, and evaluating continuing education programs in various institutions and agencies. Includes the application of adult learning principles to a variety of situations, such as workshops, in-service and staff development programs.

NURS 488 Youth at High Risk for Drug Abuse, Suicide Behaviors, Aggression, and Depression (3)

Study of adolescent problem behaviors: causes, connections, and contexts. Two central themes are understanding vulnerability to drug abuse, suicide behaviors, and other related behaviors within social network

contexts and exploring implications for prevention and early intervention programming.

NURS 489 Alcohol Problems in Family and Society (3) Analysis of family problems associated with alcoholism. Emphasis on psychological, cultural, and social implications; examination of various counseling practices employed and theories of prevention.

NURS 492 Anthropology of Refugees (3) I&S
The refugee phenomenon, its emergence in postcolonial world, and structure of life history of refugees. Ethnic change, involuntary deculturation, and acculturation as they occur in refugee life histories. Prerequisite: one 200-level ANTH course or LING 203. Offered: jointly with ANTH 492.

NURS 495 Child Rearing, Culture, and Health (3) I&S Cross-cultural study of the child-rearing practices, cultural norms, and health behavior of children and adolescents in different societies. Comparative approaches, diverse theoretical postures, and empirical research findings are used. Offered: jointly with ANTH 440.

NURS 499 Special Electives (1-4, max. 15)
Seminars on selected nursing issues of clinical problems, with independent study option, under supervision of nursing faculty. Offered: AWPpS.

NURS 500 Children and Adolescents with Special Health Needs, Their Families and Communities (3/4, max. 4) Advanced practice with infants, children, and adolescents at risk for or with chronic physical, neurobiological, developmental, or psychosocial problems. Focus on assessment and referral with select management strategies relevant for primary and specialty health care. Includes care coordination, multidisciplinary, culturally competent, and family centered approaches. Prerequisite: permission of instructor. Offered: A.

NURS 501 Advanced Mental Health Interventions with Children (3) Developmentally based assessment and therapeutic approaches relevant for children with psychosocial health problems. Consideration to matching therapeutic approaches with specific nature of symptomatology and other child, family, cultural, and environmental characteristics, including social and educational systems. Individual and group evaluation research emphasized. Prerequisite: NURS 500.

NURS 502 Human Responses in Health and Illness I (3) Survey of selected human responses to environmental demands in health and illness as expressed at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as host defenses, ventilation, circulation, elimination, and nutrition are discussed. Prerequisite: graduate standing.

NURS 503 Human Responses in Health and Illness II (3) Survey of selected human responses to environmental demands in health and illness at physiologic, pathophysiologic, experiential, and behavioral levels. Such concepts as immune response, stress response, circadian rhythms, pain, sleep, cognition, and consciousness. Prerequisite: graduate standing.

NURS 504 Clinical Nursing Therapeutics (1-6, max. 6) Critical analysis of therapeutic modalities to assist patients with a variety of responses to health problems. Includes selected therapies such as suction/drainage, positioning to address responses in critical, life threatening, and chronic/continuing health states. Varying credits

assigned for modules covering particular therapies. Prerequisite: NURS 502, NURS 503, or permission of instructor.

NURS 505 Selected Topics in Psychosocial and Community Health Nursing (2-10, max. 10) In-depth exploration of the major theoretical issues in psychosocial nursing. Seminar with analysis and discussion of selected topics and readings and implications for research and health care.

NURS 506 Role and Context of Advanced Practice Psychiatric Mental Health Nursing (3)
Introduction to advanced practice roles in Psychiatric Mental Health Nursing. Diverse populations, practice settings, health care systems, standards of practice, certification, and licensing criteria relevant to the advanced practice role examined within the context of a broad range of ethical, clinical, and educational issues. Examines future directions. Credit/no credit only.

NURS 507 Mental Health of Older Adults (3)
Examines the dynamics of mental health research and practice in normal, optimal and pathological aging. Focuses on psychosocial and environmental influences on mental health of older adults. Topics include: models of aging, cognitive impairment, depression, severe mental illness, and successful strategies to enhance mental health in older adults.

NURS 508 Seminar in Group Treatment (2)
Seminar on the theoretical basis for working with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

NURS 509 Issues in Violence and Aggression for Health Professionals (3) Focuses on research and theory of violent/aggressive behavior. Perspectives of victim, offender, family, community, society examined. Focus is recognition of violence against women. Course is designed to challenge students to clarify beliefs, values related to topics such as rape, homicide, domestic violence. Prerequisite: graduate nursing student or permission of instructor.

NURS 510 Primary Care Foundations: Diagnosis and Management of Common Health Concerns (1-3, max. 9) Focus on diagnosis and management of common primary care problems of adolescents and adults, including older adults, within advanced nursing practice. Emphasizes individual and family responses and nursing strategies including differential diagnosis, treatment, patient education, and follow-up. Content focus changes each quarter. Prerequisite: permission of instructor; recommended: concurrent field work.

NURS 511 Seminar in Neonatal Nursing (3)
Neonatal neurobehavioral and physiologic adaptation within context of physical and social environment. Neonatal responses to alterations in growth and illness. Assessment modalities and therapeutic strategies used during the neonatal period. Prerequisite: NURS 514 or permission of instructor.

NURS 512 Critical and Interdisciplinary Approaches to Women's Health (3) Critical examination of the historical, socio-political, and scientific influences on women's health. Issues of sexism, racism, and heterosexism discussed from the perspective of different disciplines. Offered: jointly with WOMEN 512.

NURS 513 Seminar in Contemporary Women's Health Issues (1-5, max. 12) Critical analysis of contemporary and historical literature relevant to health care for women across the life span. Synthesis of a holistic view of women's health to guide research and practice. Offered: jointly with WOMEN 513.

NURS 514 Physiologic Adaptations in Women and Children: Physiologic Adaptations During Pregnancy and Postpartum (1-6, max. 6)
Blackburn Analysis of developmental physiologic adaptations in four units: women/reproductive processes, pregnancy/postpartum, fetus/neonate and infancy through adolescence. Emphasis on implications for nursing practice. Examination of research basis for selected intervention strategies.

NURS 515 Common Adolescent Health Problems (3) Focuses on assessment, clinical decision making, and management of common adolescent problems. Concepts and theories of health promotion, adolescent development, and intervention strategies are explored to provide a broad framework for caring for adolescents in primary settings. Offered: jointly with EPI 549.

NURS 516 Pediatric Pulmonary Anatomy and Physiology: Clinical Applications (2) Lung development, anatomy, and physiology; clinical application when caring for children with acute and chronic lung disease. Prerequisite: permission of instructor.

NURS 517 Pediatric Pulmonary Pathophysiology: Clinical Applications (2) Applies knowledge of pediatric anatomy and physiology to assessment and treatment of pulmonary pathophysiology in children. Nursing issues in caring for children and families with acute and chronic lung disease. Prerequisite: permission of instructor.

NURS 518 Advanced Practice Pediatric Primary Care Management (3) Focuses on use of clinical decision making framework to develop theoretically and empirically sound individualized comprehensive management plans for the young child who presents with common physical and behavioral symptoms in the primary care setting. Prerequisite: permission of instructor.

NURS 519 Curriculum Development in Nursing Education (3) Theoretical rationale for curriculum development, study of curricular problems in nursing in relation to the elements of the curriculum as described in a curricular design. Prerequisite: graduate standing.

NURS 520 Evaluation of Clinical Performance in Nursing (3) For graduate students preparing for faculty or staff development positions in nursing. Theory and principles of evaluation. Instruments to appraise clinical nursing performance developed as part of course requirements. Prerequisite: graduate standing or permission of instructor.

NURS 521 Computing Fundamentals for Health Providers (3) Enables health professionals to solve work/practice challenges using existing features of desktop computers. Emphasizes productivity concepts. Introduces extended features of common software packages, as well as basic concepts/methods of small system management and support. Prerequisite: admission to Health Informatics Certificate Program or by instructor permission. Offered: jointly with MEDED 580;W.

NURS 522 Legal and Ethical Issues in Advanced Practice Nursing (3) *Shannon*
Reviews selected ethical issues in health care and legal guidelines relevant to health care decision-making. Explores bioethics as a type of applied ethics. Focuses on preparing students for ethical challenges in advanced nursing roles. Offered: jointly with MHE 542; Sp.

NURS 523 Communities, Populations, and Systems: Theoretical Foundations (3) Focus on construction and analysis of research-based philosophies and theories related to nursing practice at the community, population, and systems levels. Synthesize and apply knowledge about social and environmental justice, determinants of health, and human health responses to populations and communities. Examine and evaluate leadership roles for nurses in community settings.

NURS 524 Conceptual Foundations for Care Systems Management (3) Critical analysis of nature and theoretical bases of care systems management practice. Concepts of nursing and organization science foundations to person-provider transaction management and leadership in context of economic, political, and social environments and health outcomes. Prerequisite: graduate standing.

NURS 525 Managing Clinical Effectiveness Within Care Systems (3) Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

NURS 526 Managing Organizational Effectiveness Within Care Systems (3) Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

NURS 527 Managing Effective Access and Utilization Within Care Systems (3-4) In-depth inquiry into health care access and resource utilization patterns among diverse populations, with emphasis on management strategies for establishing effective population-system fit. Additional credit for exploring access and utilization patterns within specific populations.

NURS 528 Implications of Human Embryology and Genetics for Clinical Practice (3) Normal development of the human embryo and fetus and principles of human genetics. Alterations in development leading to common anomalies and implications for clinical practice. Prerequisite: graduate standing or permission of instructor.

NURS 529 Childhood Common Developmental and Behavior Issues (2) Focus on common developmental and behavioral issues presented by children and their families in primary care setting. Emphasis on the developmental, family, and cultural aspects of assessment and management of the common issues.

NURS 530 Conceptual Frameworks for Parent-Child Nursing (3) Designed to assist graduate students in exploration, criticism, and analysis of selected concepts, frameworks, and models relevant to parent-child nursing practice. Group seminar work focuses on the discussion of issues influencing the roles and practice of clinical nurse specialists in parent-child nursing.

Skills necessary for developing a conceptual framework for practice.

NURS 531 Selected Topics in Family and Child Nursing (1-6, max. 12) In-depth examination of the literature pertinent to major theoretical issues in parent and child nursing. Seminar with analysis and discussion of selected topics and readings. Implications for research, prevention, and health care stressed. Prerequisite: permission of instructor.

NURS 532 Professional Issues in Advanced Parent and Child Nursing (2-5, max. 5) History and current issues in advanced parent and child nursing practice and interface with health care systems. Advanced practice roles in provision, implementation, and evaluation of health care services for women, children, and families. Opportunity for application to specific advanced practice roles. Prerequisite: permission of instructor.

NURS 533 Healthcare of Cancer Survivors (2) Focuses on teaching the health science graduate students about cancer survivorship issues. Discusses the health concerns of those who have been cured of their initial malignancy but are still at risk of long-term effects of chemotherapy, radiation, and surgery. Prerequisite: PHARM 560 (PHARM D students only). Offered: jointly with PHARM 568.

NURS 534 Seminar in Nursing in Gerontology (3) Gerontological research findings applied to complex nursing problems in maintenance of health and maximum functioning in the aged.

NURS 535 Seminar in Neuroscience Nursing (3) Guided survey of clinical and experimental literatures regarding selected concepts of human functioning mediated by the nervous system: consciousness, mentation, movement, sensation, integrated regulation, coping with disability. Clinical and research measurement, current research and implications for further research, clinical applications.

NURS 536 Biological Aspects of Cancer: Implications for Care (3) Survey of major concepts from tumor biology and implications for advanced oncology nursing practice. Areas covered include carcinogenesis, cancer epidemiology, pathology, metastasis, treatments (chemotherapy, radiation, surgery, immunotherapy), and cancer detection and prevention. Discussion of role of advance nurse clinician and complex patient responses are incorporated into discussion of basic biological concepts.

NURS 537 Symptom Management in Cancer Care and Serious Illness (3) *Berry, Nguyen*
Focuses on assessment, integration of research findings into clinical decision-making, diagnostic reasoning, and management of common symptoms experienced by adult patients with cancer and/or serious illness. Explores individual and family responses to serious illness and malignant processes. Emphasizes concepts of prevention, tailored patient/family education, management and evaluation strategies. Offered: Sp.

NURS 538 Management of Adults with Respiratory Dysfunction (3) In-depth examination of problems such as abnormal secretions and shortness of breath associated with respiratory dysfunction due to pulmonary diseases and other pathophysiological states.

NURS 539 Seminar in Critical-Care Nursing (3, max. 9) Systematic inquiry into pathophysiology, initial nursing management, and systems of care for the critically ill adult or child.

NURS 540 Special Topics in Biobehavioral Nursing and Health Systems (3-6, max. 9) Guided survey of the experimental literature of major topics in physiological nursing, including cardiopulmonary, biology of aging, neuromuscular, cancer, and endocrine. Course conducted as a seminar with analysis and discussion of selected topics and readings. Implications for future research and health care are emphasized.

NURS 541 Care of Well Women (4) Examines components the components of advanced nursing/midwifery care of well women. Emphasis on assessment, diagnosis, and management of common health issues and problems of women across the life span. Prerequisite: permission of instructor.

NURS 542 Care During Childbearing I (4) Advanced nursing/midwifery care and management of the low-risk childbearing woman and fetus through preconception, prenatal, intrapartum, and postpartum periods. Prerequisite: NURS 541.

NURS 543 Advanced Practice Childbearing and Women's Health Care (1-4, max. 4) Assessment and management related to advanced nursing/midwifery perinatal care and women's health care problems. Topics covered are ambulatory antepartum and postpartum care, intrapartum care, and advanced women's health care and adolescents at risk. Module(s) selected depends on program requirements or student elective. Offered: W.

NURS 544 Psychosocial Adaptations of Individuals and Families during the Perinatal Period (3) Adaptation of individuals and families during the perinatal period, with emphasis on psychosocial adaptation, consumer education, transition to parenthood, parent-infant interaction and community based support. Prerequisite: permission of instructor.

NURS 545 Care of the Neonate and Infant (2-3, max. 3) Adaptation of neonate to the extrauterine environment and continuum of care to promote the health of infants within the context of family, community, and other environments. Prerequisite: NURS 514, NURS 528, or permission of instructor.

NURS 546 Interpersonal Aspects of Behavior (3) Selected theories in relation to psychosocial development and adaptation across life span for individuals, families, and small groups and as explanatory models of major psychosocial disabilities. General and psychosocial nursing models evaluated for heuristic value for research and practice. Prerequisite: graduate standing or permission of instructor.

NURS 547 Biologic Aspects of Psychosocial Disabilities (3) Analysis of biological processes influencing psychosocial behavior in response to internal and external stimuli. Research and theory of neuroendocrine mechanisms in psychosocial disabilities. Analysis of nursing management and evaluation of biopsychosocial modalities used in modification of behavior. Prerequisite: graduate standing in nursing or permission of instructor.

NURS 549 Assessment in Psychosocial Nursing (3) Conceptual and clinical approaches

to advanced-level data collection and diagnostic reasoning in psychiatric/psychosocial disorders. Synthesizes knowledge from psychosocial nursing and multiple allied fields to enhance learners' cognizance of principles for establishing accurate and comprehensive data bases and sound multifaceted diagnostic formulations. Emphasizes DSM diagnostic scheme.

NURS 550 White Privilege and Racism in Health and Human Services (3) Explores relationships among the psychosocial health of people of color, American cultural patterns of intersecting forms of oppression (e.g., gender, race, and class) and the role of health professionals in defining, ameliorating and/or aggravating psychosocial distress. Credit/no credit only.

NURS 551 Theoretical Foundations of Primary Care (1-3, max. 3) Presentation and interpretation of theoretical basis of advanced nursing practice in primary care. Provides students with conceptual foundation upon which to base their development as nurse practitioners. Prerequisite: graduate standing; permission of instructor.

NURS 552 Health Promotion (2-3) Emphasis on health promotion, screening, and disease prevention in primary care. Examination of individual and family wellness, models of risk assessment and behavior change, health promotion strategies, and barriers to achieving health. Opportunity to explore age-related health risks. Prerequisite: graduate standing and permission of instructor; recommended: nurse practitioner students take fieldwork concurrently.

NURS 553 The Mentally Ill Offender in Correctional and Community Settings (3) Survey of social, political, economic, legal, and moral problems posed by individuals with mental disorders who commit crimes. Covers historical antecedents and current responses of correctional and mental health systems to mentally ill offenders, prevalence and correlates of incarceration, and roles of professionals in correctional mental health field. Credit/no credit only. Offered: W.

NURS 554 Psychosocial Interventions in Nursing (3) Course focuses on conceptual foundations and interpersonal skills for therapeutic interventions to promote personal change and effective adaptation. Emphasizes forming and maintaining a therapeutic alliance and utilizing a client-centered approach to define problems and select appropriate therapeutic interventions. Examines traditional, non-traditional, and multicultural therapeutic perspectives.

NURS 555 Psychopathology, Assessment, and Diagnostics of Children 3 and Under (2-, max. 4) Psychopathology, mental health assessment, and diagnostics in children aged 3 and under, framed by the Diagnostic Classification for Developmental and Mental Health Disorders (DC:0-3). Develops skills and techniques necessary in infant mental health. Prerequisite: acceptance into Infant Mental Health Certificate program or permission of instructor. Offered: WSp.

NURS 557 Health, Culture, and Community (3) A theory and skills class concerning development of personal and organizational cultural competence in community-based participatory research. Core concepts of cultural competence are considered as they are practiced in community settings. Fieldwork required. Offered: jointly with HSERV 576.

NURS 559 Theories of Psychiatric Disabilities (3) Theories from psychosocial nursing, psychiatry, and behavioral sciences explanatory of psychiatric disabilities provide basis for identifying psychosocial problems. Structure and functions of mental health organizations and social networks analyzed. Prerequisite: NURS 547 or permission of instructor.

NURS 560 Dynamics of Community Health Practice (3/5) Examination of and experience with principles of clinical practice in community settings. Included are family as community constituent, populations at risk, community assessment, and community development. Prerequisite: graduate standing or permission. Offered: jointly with HSERV 508.

NURS 561 Selected Topics in Comparative Nursing Care Systems (2-3, max. 10) In-depth examination of the literature pertinent to major theoretical issues in cross-cultural nursing and health-care systems. Seminar with analysis and discussion of selected topics and readings. Implications for research and health care stressed.

NURS 562 Clinically Applied Anthropology (3) Anthropology as it relates to interdisciplinary delivery of culturally relevant health care. Cultural variation in illness beliefs and behavior, types of healing practices, illness prevention, social support networks. Prerequisite: graduate standing, permission of instructor. Offered: jointly with ANTH 562.

NURS 563 Advanced Community Health Nursing (3) Systematic inquiry into the nature and foundations of community health nursing. Analytic and theoretical perspectives on health risk assessment and nursing interventions in the community. Implications for community health nursing services. Prerequisite: permission of instructor and graduate standing.

NURS 564 Biopharmacological Management in Psychosocial Nursing (3) Biological and pharmacological interventions pertinent to practice of psychosocial nursing, including psychopharmacology, electroconvulsive therapy, and phototherapy. Emphasis on empirical neuroendocrine bases and then nursing management issues pertaining to these interventions. Legal and ethical issues pertaining to advanced practice and putative neurological mechanism are examined. Prerequisite: NURS 547 or permission of instructor.

NURS 565 Self-Management Strategies and Techniques in Patient Care (3) Theories underlying cognitive/behavioral self-management strategies and techniques in patient care. Evaluation of the clinical appropriateness and utility for nursing. Application to such clinical problems as abstinence in the recovering alcoholic, depression, and eating disorders. Prerequisite: graduate standing or permission of faculty.

NURS 566 Occupational Stress and Stress Management (3) Relationships between occupational stressors and worker's health, well-being, productivity. Analyzes models of occupational stress. Investigates similarities, differences between job-related stressors and stress responses in various occupations. Explores elements of worksite stress management programs. Prerequisite: graduate standing in nursing or allied health discipline; advanced undergraduates with permission of instructor. Offered: jointly with ENVH 565.

NURS 567 Theoretical Basis of Management of Stress Response (3) Theories of physiologic responses linked to theories of cognitive/affective and behavioral responses to stressors. Conceptual basis of self-management techniques. Research findings relevant to these theories and techniques examined and analyzed. Prerequisite: course in human physiology or physiologic psychology, permission of instructor.

NURS 568 Health Politics and Policy (3) Analyzes the formal and informal political context of health care delivery, professionals, and institutions in the United States. Addresses medical coverage and public persuasion, as well as policy analysis. Special attention is paid to women's political resources and participation. Credit/no credit only.

NURS 569 Observation and Assessment of Relationships (3) *Speiker* Recognizing patterns of behavior in interactions between young children and their caregivers. Assessment of relationships in the early years. Students learn to incorporate an attachment theory approach and observation tools from research into the work of their own discipline or field. Offered: Sp.

NURS 570 Family Concepts: Health and Illness (3) Emphasizes the family as unit of care across the life span. Predominant themes: factors influencing family health promotion, including resilience, vulnerability, risk reduction, and health policy; continuity, change and transition; and promotion of family health during acute and chronic illness episodes.

NURS 571 Advanced Interpersonal Therapeutics with Families (3) Models and research on therapeutic relationships and interpersonal processes evaluated and applied to group interactions among family members, among professionals, and between the family, professionals, and macrosystems. Partnership building emphasized. Individual and group characteristics examined across the life span in social, cultural, and health contexts. Prerequisite: permission of instructor.

NURS 573 Professional Issues for Nurse Practitioners (2) Presentation and analysis of current health care trends and key professional issues influencing nurse practitioner practice. The NP's leadership role, role in influencing health policy, accountability to the profession/public, marketability, and legal dimensions of practice are stressed. Prerequisite: NP student nearing program completion or permission.

NURS 574 Family Interpretation and Management of Disordered Behavior across Cultures (3) Examines interpretation and management of disordered behavior from the perspective of families — intergenerational and across cultures. Critically reviews selected theoretical frameworks for understanding families. Emphasizes theory, cultural perspective, and family assessment skills to plan relevant family interventions to assist families in managing disordered behaviors of family members.

NURS 575 Grief and Loss in Clinical Practice (2-4, max. 4) Analysis and study of social, cultural, and psychological conditions that influence human loss, grief, and death in modern society. Research findings, selected readings, and direct experience provide direction for examination of philosophic, theoretical, and pragmatic issues underlying choices and decisions in clinical practice. Open to graduate students with permission of instructor. (Limit: sixteen students.)

NURS 576 Assessment and Collaboration with Communities and Systems (3) Examine, critique and apply theory and practice in assessing and collaborating with communities, populations and systems cross-culturally. Develop techniques for working with communities and systems, including using multiple data sources, performance indicators, community mobilization, capacity building, and coalition development. Graduate level. BSN senior with permission.

NURS 577 Seminar in Infant Mental Health Intervention Models, Consultation, and Leadership (1-, max. 3) Capstone course in Infant Mental Health Certificate Program. Explores intervention models, role of consultation and leadership in the field. Field work in Infant Mental Health Program serves as context for exploring consultation and leadership roles. Synthesis and reflection of personal preparation and role encouraged. Offered: AWS.

NURS 578 Social Determinants of Health (3) Analyze the distribution and causes of health disparities in populations and communities, including but not limited to social, psychological, biological and environmental factors, to assess social determinants of health problems and their remedies. BSN senior with permission of instructor.

NURS 579 Transcultural Nursing Practices (3) Seminars examine four decades of nursing practice literature and other disciplines related to appropriate and competent care of diverse and multicultural populations. Concepts and methods from anthropology and other behavior sciences are considered in relationship with current health practice guidelines. Graduate standing or instructor permission.

NURS 580 Current Issues in Occupational and Environmental Medicine (2, max. 12) *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with ENV H 596; AWSp.

NURS 581 Study of International Health (2-3) *Hegyvary* International health based on the concept of health ecology. Assigned readings, discussions, and analyses include different perspectives, strategies, systems, and the wide range of conditions and forces that affect global and local health and illness. Emphasizes roles of health care providers. Credit/no credit only.

NURS 582 Socio-Cultural Perspectives of Public Health Genetics (3) Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with ANTH 574/PHG 521.

NURS 583 Emotions and Mental Health: From Adversity to Adaptation (3) *Betrus, Elmore* Provides an understanding of nature and function of emotions as well as relationship of emotion to mental health/illness. Emphasizes adversity arising from individual and community sources and its impact on emotional health. Addresses implications for interpersonal and social policy interventions.

NURS 584 Critical and Interdisciplinary Approach to Health Policy (3) Advanced seminar to critically analyze various public health policies from a social justice framework.

NURS 585 Introduction to Forensic Nursing and Health Care (3) *Baker* Examination of the practice, roles, functions, and evolution of the forensic nurse specialty; its relationship to other disciplines and professions; its roles working with victims of crime, violence and abuse, along with offender populations. Introduction to ethical issues in forensic health services.

NURS 586 Forensic Nursing and Health Care for Vulnerable Populations (3) *Baker* Focuses on the roles of forensic nurses and other working with populations at risk for violence, assault, and abuse; emphasizing issues related to age, race/ethnicity and gender. Examines concepts of vulnerability, dependence, and victimization; interactions with criminal justice and health care systems.

NURS 587 Role Transition Seminar (2) Emphasis on transition to doctoral study and eventual post-graduate roles. Includes information to clarify expectations and skills to facilitate success: various forms of scholarly and interpersonal communication, principles of scholarly collaboration, giving and receiving critiques, and other topics developed by participants. Credit/no credit only.

NURS 588 Philosophical Basis of Nursing Inquiry (3) Overview and critical analysis of historical and contemporary views of knowledge development and of science, with particular emphasis on the ways these views influence approaches to nursing inquiry. Emphasis on analyzing the underlying epistemological and ontological assumptions and implications of diverse approaches to knowledge generation in nursing.

NURS 589 Theoretical Perspectives in Nursing (3) Critical analysis of theory development, including evaluation of relationships among theories, evidence, and explanation. Diverse approaches used to appraise historical and contemporary milestones in the development and evaluation of nursing knowledge. Emphasis on process and implications of theory development for nursing research, practice, education, and systems. Prerequisite: NURS 588. Offered: W.

NURS 590 Ecology of Human Health (5) Focus on the pluralistic constructions of health as related to different environments. Personal and biological characteristics vary, interact with, and transform the person and the environment. Emphasis on nursing as a social construction which is interactive with the human's experience of health and healing.

NURS 591 Advanced Seminar in Nursing Science (3, max. 15) In-depth analysis and evaluation of literature in focused areas of research. Synthesis of literature related to selected fields of nursing science. Oral analysis of assigned papers and topics. Prerequisite: graduate standing or permission of instructor.

NURS 592 The Science of Nursing Therapeutics (4) Addresses the state of the science of nursing therapeutics. Students examine the practices of nursing to promote, maintain, and restore human health from an ecological perspective. Therapeutics considered from the perspectives of the individual, family, and community systems.

NURS 593 Preventive Therapeutics (3) Examines literature in the field of health promotion and illness prevention with the purpose of students developing their individual model of health promotion and illness prevention in their own foci of interest considering the social and political forces prevailing.

NURS 594 Advanced Seminar on Healing (3) Advanced seminar to critically analyze current thinking and practice applications that fall under the heading of "healing."

NURS 595 Synthesis of Nursing Science (3) Provides a forum for critical analysis, integration, and synthesis of core content provided during the initial year of the Ph.D. in Nurse Scientist Program and further planning of program of study. Prerequisite: completion of first year required courses of doctoral program. Credit/no credit only.

NURS 596 Colloquium, Scientific Conduct, and Dissertation Seminar (2, max. 12) Focuses on group discussion of issues pertinent to research conduct. Scientific conduct issues include guidelines relevant to designing, conducting, and disseminating research; risk management in reference to scientific misconduct and negligence; and collaborative and peer-review skills relevant to intra- and interdisciplinary research.

NURS 599 Selected Readings in Nursing Science (1-3, max. 18) Analysis of synthesis of selected readings with faculty mentor. Credit/no credit only. Prerequisite: permission of instructor.

Nursing

NSG 501 Teacher Practice Essentials-Models of Teaching & Learning (3) Integrative approach to understanding teaching learning that explores how various educational models and principles frame the processes of teaching and learning. Focus toward advanced practice nurses interested in teaching. Prerequisite: permission of instructor and graduate student status.

NSG 502 Advanced Teacher Practice Essentials-Expertise in Teaching (3) Critical analysis of how educational models and principles frame teaching to promote expertise in practice. Aimed toward advanced practice nurses interested in teaching. Builds and expands content of NSG 501. Prerequisite: NSG 501 and graduate student status.

NSG 503 Advanced Teacher Practice Essentials-Diverse Learners (3) Focus on relevance and inclusiveness of addressing diversity of learners within teaching and learning activities. Aimed toward advanced practice nurses interested in teaching. Further expands content of NSG 501 and NSG 502. Prerequisite: NURS 501 and graduate student status.

NSG 504 Advanced Teacher Practice-Challenges in Teaching (3) Focus on challenges facing educator during teaching encounters. Addresses influence of belief structures on learner's motivation for change. For advanced practice nurses interested in teaching. Prerequisite: NSG 501 and graduate student status.

NSG 505 Applied Occupational Health and Safety (3) *Camp, Johnson* Application of occupational safety and health principles. Student teams perform evaluations, assess production methods/processes and exposures,

health and safety procedures and programs, and develop engineering and administrative controls. Students perform on a consulting project with a local company including budgeting, project reporting, and presentation. Offered jointly with ENVH 559 and IND E 567. Offered: Sp.

NSG 506 Organizing and Administering Industrial Safety and Health Programs (4)

Explores industrial organization and methods of integrating safety and industrial hygiene programs with industrial operations. Investigates philosophic issues related to industrial safety and health such as responsibility for safety, dependency on safe practice, and hierarchy of prevention. Contains numerous case problems and student involvement opportunities. Offered: jointly with ENV H 560; A.

NSG 507 Technical Aspects of Safety and Health (3)

Explores specific hazards associated with major industries, as well as hazards common to all industries. Covers machine guarding, electrical safety, systems safety analysis, materials handling, and working at heights. Offered: jointly with ENV H 562; W.

NSG 508 Introduction to Ergonomics (3)

Basic principles of ergonomics in work environment applied to problems of worker and management. Topics include measurement of physical work capacity, problems of fatigue and heat stress, applied biomechanics, worker-machine interactions and communication, design of displays and controls. Prerequisite: basic human physiology or permission of instructor. Offered: jointly with ENV H 566/IND E 566; W.

NSG 509 Pathophysiology for Advanced Practice Nursing (1)

Synchronous Web pathophysiology class addresses immune and inflammatory responses with related content on infections and atherosclerosis. Focus on understanding the physiologic/pathophysiologic basis for disease processes and the relationship of various treatment modalities to these concepts. Prerequisite: Recent (within 5 yrs.) upper division anatomy/physiology course or permission of instructor.

NSG 510 Assessment and Management of Neonatal Problems (5)

Focus on pathophysiology of disease processes, assessment, diagnosis, and management of common health problems experienced by term and preterm neonates in neonatal intensive care settings. Includes foundations for clinical decision making for neonatal nurse practitioners and examination of interdisciplinary roles. Prerequisite: NURS 514.

NSG 511 Prevention Issues in Community Health (3)

An interdisciplinary overview of community health prevention approaches focusing on the social determinants of health and health disparity reduction among vulnerable populations. Analysis of community and population preventive strategies across the life course. Roles of advanced community health nurses as prevention leaders and consumers of prevention information are emphasized. Offered: Sp.

NSG 512 Prevention Critique in Community Health (3)

Critical examination of community health prevention programs that build community health capacity and show promise in facilitating long-term health equity among vulnerable populations. Focuses on the leading health disparities among USA racial and ethnic people of color, and how to be a critical program consumer, adopter and adapter. Offered: A.

Nursing Clinical

NCLIN 302 Practicum: Health Assessment (1-5, max. 5)

Lecture and lab emphasize nursing skills in communication, interviewing, functional and physical health assessment. Includes: basic communication skills, beginning physical and psychosocial assessment of the individual across the lifespan, and family assessment. Credit/no credit only. Offered: AS.

NCLIN 306 Practicum: Basic Skills of Nursing Practice (4)

Practicum in communication, interviewing, health assessment, identification of threats to health in clinical settings. Explores risk, vulnerability identification, communication, physical/psychosocial assessment of individuals across lifespan, nursing care planning, documentation, psychomotor skills development. Credit/no credit only. Prerequisite: NCLIN 302, which may be taken concurrently.

NCLIN 402 Practicum: Care in Illness I (4)

Provides supervised nursing care to individuals/families with acute/ chronic illness across the lifespan. Emphasizes beginning skills in systematic assessment, including person/environment fit, developing competency in selected nursing therapies, and developing role as care agent for persons of all ages. Credit/no credit only. Prerequisite: NCLIN 401, which may be taken concurrently.

NCLIN 406 Practicum: Care in Illness II (1-10, max. 10)

Provides supervised nursing care to individuals and families with acute and chronic illness. Emphasis on increasing skill in systematic assessment, developing competency in selected nursing therapies, and developing role as caring agent for persons of all ages. Credit/no credit only.

NCLIN 409 Partnerships in Community Health (6)

Analysis, application, and evaluation of community partnership process for health. Analysis of nursing role in community/public health, including community building, collaboration, policy. Development and formulation of community interventions to maintain/promote biopsychosocial health/promotion of health/prevention of injury and disease.

NCLIN 416 Practicum: Nursing of Families: Childbearing and Childrearing (4)

Provides the opportunity for supervised nursing of childbearing and childrearing families and individuals. Emphasizes expanding nursing process skills, especially health promotion, with individuals and families during childbearing and childrearing. Credit/no credit only. Prerequisite: NURS 415, which may be taken concurrently. Offered: AW.

NCLIN 418 Practicum: Psychosocial Nursing (4)

Provides supervised psychosocial nursing care to individuals/families/groups/communities with threats to or alterations in psychosocial health. Emphasizes increasing skill in systematic assessment, developing competency in selected psychosocial nursing interventions, and evaluation of treatment outcomes. Credit/no credit only. Prerequisite: NURS 417, which may be taken concurrently. Offered: AW.

NCLIN 490 Special Laboratory Elective (1-4, max. 4)

Altman Provides supervised laboratory experience to enhance and document clinical skills and decision making.

NCLIN 500 Comprehensive Health Assessment (3)

Provides framework for systematic collection, interpretation, and communication of

data to determine health status of individuals. Develops beginning advanced practice competence in history-taking and screening physical examination of adolescents and adults. Analysis of multiple health indicators to determine health status. Credit/no credit only. Prerequisite: permission of instructor.

NCLIN 501 Diagnostic Health Assessment (1-5, max. 5)

Provides framework for learning symptom analysis, selection/performance of examination techniques, and selection/interpretation of common diagnostic procedures. Develops beginning competence in focused history-taking and directed physical exam to evaluate common health problems in adolescents and adults. Credit/no credit only. Prerequisite: NCLIN 500, which may be taken concurrently.

NCLIN 502 Pediatric Health Assessment and Promotion (1-5, max. 5)

Gives experience in obtaining a health history and performing a physical assessment of infants, children, and adolescents. Interviewing techniques, problem-oriented charting, and a systems approach to the physical examination. Emphasis on screening principles, health promotion, and wellness care for children/families. Credit/no credit only. Prerequisite: permission of instructor.

NCLIN 503 Advanced Fieldwork Community Health Nursing (2-6, max. 12)

Guided experience in delineating nursing roles in community settings. Development of a philosophy of community health nursing. Application of core concepts pertaining to health, ethics, care, and community. A minimum of four hours of guided experience weekly. Prerequisite: graduate standing and permission of instructor.

NCLIN 505 Diagnostic Testing and Monitoring in Serious Illness (2)

Lecture, discussion, and laboratory sessions to develop students' assessment, diagnostic, and monitoring expertise in the care of acutely ill individuals. Students refine clinical decision-making skills, apply specialized assessments, gain insight into clinical experts' critical thinking, and refine assessment knowledge for a specific patient population. Prerequisite: NCLIN 501 or equivalent.

NCLIN 508 Seminar in Group Treatment (1)

Seminar on the theoretical basis for working with various treatment groups. Analysis of selected approaches to group treatment. Analysis of leader responsibilities and functions in the development of therapeutic group experiences.

NCLIN 509 Teaching Methods and Practicum in Nursing Education (2-10, max. 10)

Guided experience in selected teaching-learning situations in nursing, in both classroom and clinical situations. Identification, analysis, and solution of teaching-learning problems in clinical nursing. Minimum of seven hours of guided experience weekly.

NCLIN 510 Group Work with High-Risk Youth (3-6, max. 6)

Theory and application course in group counseling for high-risk youth. Central theme is group leader effectiveness in helping young people increase school performance, decrease drug involvement, and increase emotional well-being. Open to graduate students in nursing, education, and related human services professions.

NCLIN 512 Advanced Practicum in Parent and Child Nursing I (2-12, max. 25) Clinical seminar and practicum provide opportunities to develop

advanced nursing practice competencies in the care of women, parents, children, and/or adolescents. Application of theory and principles to direct care, consultation, education and/or care coordinator roles with individuals and/or groups.

NCLIN 514 Seminar in Home Care for Chronic Illness (3) Home-care services as component of community health nursing. Understanding effects of direct nursing functions on care of chronically ill persons and their families. Selected field study experiences in community health settings. Prerequisite: NURS 563, graduate standing, and permission of instructor.

NCLIN 525 Managing Clinical Effectiveness Within Care Systems (1) Optimizing person-provider clinical therapeutic transactions at multiple levels of care systems complexity and population aggregation. Emphasis on designing, managing and evaluating clinical effectiveness and efficiency within care systems. Prerequisite: NURS 524 or permission of instructor.

NCLIN 526 Managing Organizational Effectiveness Within Care Systems (1) Analysis of management strategies for attaining effective and efficient organizational structures and processes within health care systems. Prerequisite: NURS 524 or permission of instructor.

NCLIN 531 Nursing Process in Parent-Child Nursing (4) Includes lecture, seminar, and laboratory instruction designed to assist the student with knowledge and skill acquisition related to nursing care of individuals and families with regard to childbearing and childrearing. Prerequisite: NURS 530.

NCLIN 540 Relationship Development and Intervention (3-, max. 15) Clinical work with infant and toddlers and their parents in relation to infant disorders of affect, self-regulation, attachment trauma, and stress disorders. Reflective supervision in groups and individually required. Restricted to candidates in the Infant Mental Health Certificate Program. Credit/no credit only. Offered: AWSpS.

NCLIN 541 Advanced Practice Specialist Clinical Practicum (1-10, max. 10) Apply, synthesize, evaluate, and communicate knowledge about a specific domain of advanced medical/surgical or forensics nursing practice. Emphasis is on specialization and role development. Prerequisite: Related sciences (CNS, NE, APGN, ID-CNS, IC-APN), or NURS 509 and NURS 585; or permission of instructor.

NCLIN 542 Advanced Practice Specialist Clinical Practicum II (1-10, max. 10) Apply, synthesize, evaluate, and communicate knowledge about a specific domain of advanced medical/surgical or forensics nursing practice. Fieldwork emphasizes greater depth/complexity/independence in specialization and role development. Seminars emphasize critical analysis of role-related issues. Capstone experience for clinical practicum. Credit/no credit only. Prerequisite: NCLIN 541.

NCLIN 543 Advanced Practice Specialist Clinical Practicum III (1-10, max. 10) Apply, synthesize, evaluate, and communicate knowledge about a specific domain of advanced medical/surgical or forensics nursing practice. Role development within specialty context. Emphasis is on critical analysis of leadership-related issues. For students in final clinical,

serves as capstone. Credit/no credit only. Prerequisite: NCLIN 542.

NCLIN 544 Advanced Practice Specialist Clinical Practicum IV (1-10, max. 20) Apply, synthesize, evaluate, and communicate knowledge about a specific domain of advanced medical/surgical or forensics nursing practice. Fieldwork serves as capstone experience. Seminar emphasis is on consultation and collaboration. Credit/no credit only. Prerequisite: NCLIN 543.

NCLIN 546 Management of Acute and Chronic Wounds (2-3) Evaluation and treatment of acute and chronic wounds. Includes wound healing physiology, pathophysiology, patient evaluation, evaluation of environmental and systemic factors related to risk of impaired healing, methods for assessing wound progress, and evidenced based treatment options. Optional one credit clinical and lab experience. Prerequisite: graduate standing or permission of instructor.

NCLIN 549 Nurse Practitioner Clinical Practicum I: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced nursing practice with individual/groups. Students practice under clinical preceptor supervision. Focuses on data collection/critical thinking related to health status and threats to health, incorporating knowledge from the biological, behavioral, and social sciences. Credit/no credit only. Prerequisite: permission of instructor, or NCLIN 501 or equivalent.

NCLIN 550 Nurse Practitioner Clinical Practicum II: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 549, emphasizing critical thinking related to the differential diagnosis/management of health problems and human responses. Students practice under clinical preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 549 or permission of instructor.

NCLIN 551 Advanced Practice Nursing Clinical Practicum III: Adults/Older Adults (1-10, max. 10) Clinical fieldwork and seminar in advanced practice nursing. Builds on NCLIN 550, emphasizing the integration and application of previous learning in the care of people with multiple health problems. Students practice under preceptor supervision. Addresses selected role issues in advanced practice nursing. Credit/no credit only. Prerequisite: NCLIN 550 or permission of instructor.

NCLIN 552 Nurse Practitioner Clinical Practicum IV: Adults/Older Adults (1-10, max. 10) Intensive clinical experience in which students integrate previous learning to assume responsibility for care of older adults and/or adults with multiple health problems. Students practice as an advanced practice nurse supervised by a preceptor, assuming increasing responsibility for planning/implementing therapies and for documenting/evaluating outcomes. Credit/no credit only. Prerequisite: NCLIN 551.

NCLIN 553 Seminar in Primary Care I: Health Promotion (2) Weekly seminars with supervised field study within selected primary-care and wellness settings. Emphasis on health assessment and strategies related to improving health in people of all ages. Analysis of, and counseling on, life-styles, nutrition, physical fitness, stress management, self-care, and

prevention. Credit/no credit only. Prerequisite: graduate standing, permission of instructor.

NCLIN 554 Occupational Health Nursing: Practice Issues (2-6, max. 6) In-depth overview of occupational health and safety. Includes discussion of American workforce, work environments, regulations, and political issues; identifies trends which affect practice; introduces prevalent health disorders which result from occupational exposure; examines and applies nursing theory to the prevention and control of occupational injuries and illnesses.

NCLIN 556 Seminar in Primary Care II: Management of Common Health Concerns (3) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 557 Seminar in Primary Care III: Management of Common Health Concerns (3) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary health-care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 558 Occupational Health Nursing: Program Development (2-6, max. 6) In-depth examination of occupational health and safety programs including organizational analyses, budgeting, marketing, case management, and workers' compensation; also political, economic, legal, and ethical issues. Focuses on development, implementation, and evaluation of programs including health promotion, EAP, and health surveillance. Applies public health and nursing sciences to selected work-related problems.

NCLIN 559 Seminar in Primary Care IV: Management of Common Health Concerns (3-5) Focus on research questions, patient presentations, and group discussions drawn from field study. Supervised clinical field study within selected primary care settings and weekly seminar discussions related to theory presented in NURS 510. Credit/no credit only. Prerequisite: permission of instructor; nurse practitioner students register for NURS 510 concurrently.

NCLIN 560 Seminar in Primary Care V: Complex Clinical Decision Making [(1-11)-, max. 11] Seminar with associated field study. Synthesis of advanced knowledge base and clinical family nurse practitioner skills with effective management of complex clinical problems. No grade given until 11 total credits completed. Credit/no credit only. Prerequisite: graduate standing and permission of instructor.

NCLIN 566 Advanced Clinical Practicum in Psychosocial Nursing (1-9, max. 20) Seminar and practicum focus on development of advanced clinical and role-function skills. Practicum in settings with select populations under supervision of expert clinicians. Seminars use evidenced-based practice criteria to integrate cases into discussion. Credit/no credit only. Prerequisite: NURS 570, NURS 564, one theory course, or permission of instructor.

NCLIN 570 Practicum in Adult Psychosocial Assessment (2) Under supervision of faculty/

preceptors from clinical agencies, students use evidence-based practice criteria to assess individuals, groups, and families. Students gain skills in psychosocial interviewing, mental status examinations, and assessing psychosocial variables by standardized instruments and clinical interview. Credit/no credit only. Prerequisite: NURS 549 or permission of instructor.

NCLIN 572 Practicum in Physical Assessment (2) Physical health assessment in practicum with the opportunity to refine skills in taking a complete health history and in performing physical examinations in a clinical setting. Credit/no credit only Prerequisite: either NURS 510 modules ABC, or NURS 510 modules HI; NCLIN 500; 501, or permission of instructor.

NCLIN 573 Advanced Field Study in Family Nursing (2-9, max. 9) Advanced practice development in direct care, consultation, and/or care coordination with individual families or groups of families across the life span. Opportunities provided to strengthen interpersonal therapeutic process skills, family nursing approaches relevant to family health promotion, problematic family health patterns. Prerequisite: concurrent registration in NURS 572, NCLIN 574; recommended: NURS 571.

NCLIN 599 Independent Study Clinical Practicum (1-12, max. 25) Clinical practicum to develop advanced-practice nursing skills in care of individuals, groups, communities, or care systems. Individually arranged with faculty member for application of theory and principles to direct care, consultation, education or care coordinator roles. Prerequisite: matriculated MN student or post-masters student, and permission of academic adviser and instructor. Offered: AWSpS.

Nursing Methods

NMETH 403 Introduction to Research in Nursing (3) Organization of the structure of nursing knowledge through research. Concepts and processes of research utilized in the investigation of nursing science.

NMETH 499 Undergraduate Research (1-5, max. 12) Supervised individual scholarly inquiry on a specific nursing problem.

NMETH 515 Sociobehavioral and Prevention Research Methods for HIV and STI (3) *Kurth* Focuses on prevention methods for controlling HIV/STI epidemics, identifying a range of alternatives along the prevention continuum as most appropriate and feasible for settings and populations, and solutions to increase HIV/STI prevention agenda in public health and clinical policy and practice. Offered: jointly with EPI 549; Sp.

NMETH 521 Methods of Research in Nursing (2) Continuation of 520, with emphasis on methods of research applied to the solution of problems in all fields of nursing.

NMETH 522 Data Management for Research Professionals (4) Surveys industrial strength data management, using techniques applicable to multi-center, longitudinal research trials with survey instruments. Involves challenges research professionals face as they graduate from a student project to a study with hundreds of cases, variables, multiple survey instruments and a staggered, repeated sampling protocol. Credit/no credit only.

NMETH 526 Patient-Centered Interactive Health Communication Technologies(3) Overview of current and emerging consumer-centric eHealth tools and technologies. Researchers and practitioners from multiple disciplines present theories, concepts, and principles from health, information, cognition, and human-factors sciences as they relate to development and use of these tools and technologies.

NMETH 527 Introduction to Health Informatics and Systems Thinking (3) *Masuda, Oyler* Examines how informatics aids in the transformation of healthcare delivery and how to most effectively use the theories and best practices in informatics toward building and deploying informatics solutions. Offered: jointly with MEBI 581. Offered: A.

NMETH 528 Computing Concepts: From Theory to Application (3) *Johnson* Survey of conceptual and applied computing concepts. Conceptual topics include a global survey of hard/software, networking, information systems analysis/design, and programming. The applied component emphasizes desktop system management skills and the creative use of spreadsheets to enhance personal productivity. Offered: jointly with MEBI 580. Offered: W.

NMETH 529 Database Concepts and Applications in Clinical Informatics (3) *Oyler* Introduction to relational database theory and technology from a health informatics perspective. Focuses on transactional database theory, architecture and implementation in a socio-technical context. Analyses database applications used in clinical environments. Introduces knowledge bases and data warehouses. Offered: jointly with MEBI 582. Prerequisite: NMETH 528. Offered: Sp.

NMETH 530 Scholarly Proposal Development (2) *Jarret, Killien, Schepp, Simpson* Focuses on the application of methods of inquiry to develop a scholarly proposal through faculty-guided small group discussion and individual composition. Prerequisite: NMETH 520. Offered: AWSpS.

NMETH 570 Seminar in Clinical Research in Nursing (3) Philosophy, problems of design; use of criterion measures in terms of patient care.

NMETH 575 Methodological Issues in Family Research (3) Emphasizes research with the family as unit of analysis. Examines patterns of family functioning in relation to responses to health situations. Reviews family units from generational and intergenerational perspectives. Critiques methods assessing dyadic and triadic relationships and therapeutic interventions on family outcomes. Prerequisite: permission of instructor.

NMETH 580 Methodological Perspectives in Nursing Inquiry (5) Allows students to translate philosophical and theoretical perspectives into research methodologies. Foci will include: the relationship of theoretical perspectives to methodologies; the methodological issues among and between varying schools of thought (including contemporary empiricist, interpretive, and critical/postmodern); and how the methodologies influence choices of research design and methods.

NMETH 581 Observational Research Methods (2-6, max. 6) Examines observational methods for conducting verbal and nonverbal behavioral research. Emphasizes critical analysis and rigor in research question formulation, measurement

decisions, coding scheme development, data collection, and analysis and interpretation of data. In-depth application of observational method optional. Prerequisite: graduate standing and basic research methods course or permission of instructor. Offered: W.

NMETH 582 Interpretative Methods in Nursing Research (4-) Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of Instructor.

NMETH 583 Interpretative Methods in Nursing Research (-4) Seminar and field practicum for interpretative research methods. Study on health-related issues using a selected tradition in interpretative methods. Prerequisite: permission of Instructor.

NMETH 584 Methods: Physiologic Measures (4) Exploration of the measurement of physiologic functioning in human and animal models. Examples include biochemical and biophysical measure. Students develop beginning skills with one physiologic measure. Prerequisite: physiology and chemistry and permission of instructor.

NMETH 585 Meta-Analysis (4) Meta-analysis examined as a method to synthesize research. Overview of meta-analytic methods; description of the collection, analysis, synthesis, and reporting of studies; explanation of statistical calculations; and discussion of reliability and validity measures incorporated into meta-analytic design. Prerequisite: permission of instructor.

NMETH 586 Instrument Development and Testing (4) Includes measurement theory, reliability, validity, level of measurement, and the process of scale development, modification, or translation. Students learn to evaluate, develop, modify, translate, and test instruments for use in research. Prerequisite: student in health science discipline and permission of instructor.

NMETH 587 Methods of Theory Testing: Causal Modeling with Path Analysis and Structural Equation Modeling (4) Includes causal inferencing and theory testing through causal modeling with path analysis and structural equations modeling. Students learn to evaluate theory models and to apply the content by developing and testing models. Prerequisite: student in health science discipline and permission of instructor.

NMETH 590 Special Topics in Nursing Research (2-3, max. 9) Examination of a specific research method, with evaluation of appropriateness, efficiency, rigor of measurement, and potential for inference for nursing research. Prerequisite: minimum of 5 credits of basic nursing research methodology at graduate level and permission of instructor.

NMETH 591 Clinical Outcome Research I (4) Examination of philosophical, analytical, and methodological decisions and processes in evaluating the effectiveness of interventions and programs designed to enhance health outcomes. Alternative designs are addressed in consideration of underlying assumptions about prevention/causation research; clinical human phenomena; design sensitivity; and threats to validity. Theory development emphasized. Prerequisite: permission of instructor.

NMETH 592 Clinical Outcome Research II (2-

4, max. 4) Application and evaluation of philosophical, methodological, and analytical concepts and issues examined in 591. Two modules are offered: a) case study and small-n studies and b) large-n studies. Students demonstrate application of decision-making process involved in development of clinical outcome study. Prerequisite: permission of instructor.

NMETH 593 Time Series and Sequential Analysis (4) Basic introduction to terminology and methods of time series and sequential analysis as applicable to nursing-relevant processes in the form of samples of interval and categorical data collected over time; autocorrelation, autoregression, spectrum, socinor, Markovian, lag sequential, and log-linear analyses. Development of practical analysis skills on real data sets. Prerequisite: permission of instructor. Credit/no credit only.

NMETH 600 Independent Study or Research (*) Credit/no credit only.

NMETH 700 Master's Thesis (*) Credit/no credit only.

NMETH 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of Supervisory Committee chairperson or graduate program adviser.

College of Ocean and Fishery Sciences

Aquatic and Fishery Sciences

FISH 101 The Living Aquatic World (5) I&S/NW Freshwater and marine biodiversity, population, biology, ecosystem structure and function, evolution, conservation genetics, physiology, aquaculture, environmental effects of human activities, role of law, government, and human communities in resource conflicts management. Three case studies. Suitable for non-majors. Offered: jointly with ENVIR 101.

FISH 210 Methods in Fisheries and Aquatic Sciences: Theory and Applications (5) NW Comprehensive survey of the theory and techniques of field research in aquatic sciences. Topics emphasize sampling design, data collection, and interpretation across a broad suite of topics and approaches. Field trips and laboratory sections are mandatory. Recommended: 10 credits in biology.

FISH 250 Marine Biology (3/5) I&S, NW Lecture-laboratory course in Marine Biology focusing on physical, biological, and social aspects of the marine environment. Topics include oceanography, ecology, physiology, behavior, conservation, fisheries, exploration, and activism. Evening marine biology movies and weekend field trip. Honors section research project. Offered: jointly with BIOL/OCEAN 250.

FISH 296 Study Abroad: Aquatic and Fishery Sciences (0) NW For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit not does not apply to major requirements without approval.

FISH 297 Special Topics in Fisheries (1-5, max. 5) NW Selected topics in aquatic science and fisheries.

FISH 310 Biology of Shellfishes (5) NW Commercially important mollusks, crustaceans, and other harvested invertebrates highlighted with respect to systematics, anatomy, reproductive strategies, feeding, and growth. Examples of species that demonstrate variability in recruitment and complex life cycles. Laboratories, field trips. Recommended: 10 credits biological science.

FISH 311 Biology of Fishes (3/5) NW Lecture and laboratory, of the morphological, physiological, behavioral, and ecological diversity of fishes of the world; designed to provide a basic foundation for advanced courses in all areas of finfish fisheries. 3-credit option does not include laboratory. Recommended: 10 credits biological science. Offered: jointly with BIOL 311; W.

FISH 312 Fisheries Ecology (3/5) NW Ecological characteristics of fishes and shellfishes in the important freshwater and

marine habitats of North America. Relationship between physical aspects of the habitats and community structure. Impacts of human activities on diversity and abundance. Prerequisite: either BIOL 162 or 220; recommended: FISH 210; FISH 311. Offered: Sp.

FISH 323 Conservation and Management of Aquatic Resources (5) NW Topics include population growth rates, extinction risk, dynamics of populations at low densities, meta-populations, marine reserves, endangered species classification, sustainable harvesting and management institutions. Examines case studies such as salmon, albatross and whales as representative of conservation issues in aquatic sciences. Sampling, experimental design, computer skills and research writing.

FISH 324 Aquatic Animal Physiology and Reproduction (3/5) NW Adaptations of aquatic animals to environmental challenges. Energy pathways from feeding and digestion through maintenance (metabolism, movement, repair), homeostasis (respiration, osmoregulation, thermoregulation), growth and reproduction (sex determination, manipulation, sex change). Roles of sensory, nervous, and endocrine systems in mediating environmental information. Hands-on laboratory. Prerequisite: either BIOL 161 or BIOL 220.

FISH 328 Forestry-Fisheries Interactions (4) NW Characteristics of forestry-fisheries interactions in terrestrial and aquatic landscapes. Effects of changes in landforms on forest and aquatic communities. River basin and watershed features. Forest stand dynamics, forest hydrology, fish and wildlife histories and behavior. Resource conflicts and resolution. Offered: jointly with ESRM 328; W.

FISH 340 Genetics and Molecular Ecology (5) NW Application of molecular markers to ecology, evolution, and the management of living resources. Emphasis on understanding the strengths and weaknesses of the approach based on case studies. Offered: jointly with BIOL 340. Prerequisite: either BIOL 102 or BIOL 200.

FISH 350 Marine Ecology of Coastal Systems (3) Explores the ecological relationships of marine organisms in coastal systems, including kelp forests and coral reefs, the physical forces that shape these systems, and the impacts of environmental change. Recommended: BIOL 250/FISH 250/OCEAN 250. Offered: jointly with SMA 350; W.

FISH 351 Field Investigations in Marine Biology (5) Evaluates the relationships between man and marine systems in a field-oriented class. Case studies directly investigate marine biology. Studies include human activities and our effects on marine species and communities. Multiple field trips, lectures, and labs. Prerequisite:

site: FISH 350/OCEAN 350. Offered: jointly with OCEAN 351; Sp.

FISH 401 Systematics, Zoogeography, and Evolution of Fishes (5) NW Advanced course in ichthyology with emphasis on living bony fishes of the world; past and present biodiversity, evolutionary history, classification, comparative morphology, geographic distribution, and historical zoogeography. Recommended: 10 credits biological science.

FISH 404 Diseases of Aquatic Animals (5) NW Overview of communicable and noncommunicable diseases that affect fish and shellfish. Major pathogens of free-ranging as well as captive animals discussed. Students learn to recognize, prevent, and control economically and ecologically important disease syndromes. Recommended: 10 credits biological science.

FISH 405 Molluscan Aquaculture and Fisheries (5) NW Biology, ecology, management, and economic importance of oysters, clams, scallops, mussels, abalones, cephalopods, and other mollusks. Emphasis on techniques for production through aquaculture as well as harvest strategies for wild stocks. Field trips. Recommended: 10 credits biological science.

FISH 406 Crustacean Fisheries and Aquaculture (4) NW Biology, ecology, management, and economic importance of shellfish, emphasizing crustaceans. Wild populations and aquaculture production of important phyla discussed. Field trips. Recommended: 10 credits biological science.

FISH 415 Fish Physiology (5) NW Examines physiological principles and adaptations of fish for growth, metabolism, salt and water balance, digestion, locomotion, special senses, stress, reproduction, and neural and endocrine control mechanisms. Emphasis on environmental physiology and evolution. A nine-week laboratory component involves original experiments with juvenile salmon in hatchery on campus.

FISH 420 Ecology of Marine Fishes (4) NW Focuses on the unique ecological challenges facing marine fishes, including individual, population, community, and ecosystem-scale processes. Prerequisite: either FISH 311 or FISH 312.

FISH 424 Biology and Culture of Aquatic Organisms (5) Explores the concept of sustainability and the interrelationship between environment, aquatic species, and culture of aquatic animal and plant species globally. Current practices, animal biology and health, near-shore ecosystem conservation, water quality, and strategies to improve the sustainability of aquaculture for food production and species conservation. Lecture and lab.

FISH 428 Restoration of Fish Communities and Habitats in River Ecosystems (5) NW

Examines opportunities to encourage recovery through natural developmental processes that enhance the complexity of habitats and connectivity between habitats in the river basin. Class discussion and participation on field trips focuses on current restoration concepts for ecosystems, designs of projects, and case studies. Recommended: fish ecology and hydrology courses. Offered: odd years; Sp.

FISH 429 Seminar in Streamside Studies (1, max. 6) Discussion by invited speakers on current research and issues related to streamside studies. Speakers are a mix of on-campus and off-campus experts. Credit/no credit only. Offered: jointly with CFR 429; A/WSp.

FISH 430 Biological Problems in Water Pollution (3/5) NW Ecological risk assessment of toxic chemicals and problems associated with electrical power production. Considers safety and toxicity and effects on individuals, populations, and communities. Laboratory covers simulation models of chemical exposure and community effects. Recommended: senior or graduate standing in fisheries, engineering, or related field. Offered: jointly with CEE 461.

FISH 438 Biological Monitoring and Assessment (5) NW Explores the technical questions (conceptual, sampling, and analytical), the rationale, policy relevance, and legal basis for tools — existing and needed — to assess ecological health. Prepares students to see the biological components of ecological systems in diverse ways. Offered: jointly with BIOL 438.

FISH 439 Attaining a Sustainable Society (1/3, max. 3) I&S/NW *Karr* Discusses diverse environmental issues, the importance of all areas of scholarship to evaluating environmental challenges, and the connections between the past and the future, to reveal integrative approaches to protect the long-term interests of human society. Offered: jointly with ENVIR 439.

FISH 444 Conservation Genetics (5) NW Advanced genetic concepts and methods related to aquatic species' conservation and management. Includes genetic diversity, small populations and fragmentation, genetic viability, management of wild and captive populations (including aquaculture), reintroductions, hatchery-wild interactions and forensics. Labs include molecular techniques. Recommended: GENET 371.

FISH 447 Watershed Ecology and Management (3) NW Explores fundamental ecological processes at the watershed scale, identifies human-induced changes to ecological systems, and discusses approaches to improve watershed management. Includes lectures, field trips, and discussions with organizations and agencies about how they are addressing ways to improve watershed management. Offered: W.

FISH 450 Salmonid Behavior and Life History (3/5) NW Marine distribution, homing migration, and spawning behavior of adult salmon: incubation, emergence, migration, and residence of fry; fingerling distribution and residence with reference to species interaction and population evolution. Recommended: FISH 311. Offered: A.

FISH 451 Reproduction and Early Development of Fishes (4) NW Reproductive development, sexual maturation, spawning and incubation in selected fish species; embryology

and developmental traits of different salmonid and non-salmonid species; practical experience in artificial spawning techniques, egg handling and care, incubation techniques and the handling of newly-hatched alevins. Recommended: FISH 310; FISH 311.

FISH 452 Aquatic Animal Nutrition (5) NW Nutritional requirements, nutrient interactions of aquatic animals in the wild or raised in captivity for purposes such as stock enhancement, food production, the aquarium/ornamental fish industry. Nutritional needs of marine mammals. Feed ingredients, formulation techniques, environmental impacts. Experimental design, completion of laboratory nutritional study. Recommended: 10 credits biological science.

FISH 453 Spatial Information Technologies in Ecosystem Sciences (3) NW *Logsdon* Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting. Two overnight weekend field trips required. Offered: jointly with OCEAN 452.

FISH 454 Ecological Modeling (4) Key concepts in ecological modeling and quantitative methods, focusing on the rationale, interpretation, and motivation for modeling in ecological sciences. Individual-based, population matrix, and ecosystem models. Excel and Matlab-based computer exercises, simple model building, readings.

FISH 455 Fish and Wildlife Toxicology (3/5) NW Overview of fish/wildlife toxicology: history of the field; regulations; methods used to assess risks contaminants pose to fish/wildlife; classes of contaminants and their direct, sublethal and indirect effects; and contemporary threats of contaminants to fish/wildlife, their habitats and prey. Includes laboratory. Offered: jointly with ESC 457; W.

FISH 456 Introduction to Quantitative Fishery Science (5) NW Conveys fundamental concepts of fish population dynamics and fishery management within context of real-world fisheries problems. Lectures discuss notation, terminology, mathematical models, fisheries principles, and case studies. Laboratory time devoted to practical applications, problems. Recommended: either MATH 125, MATH 135, or Q SCI 292; Q SCI 381. Offered: jointly with Q SCI 456; A.

FISH 457 Design and Evaluation of Marine Protected Areas (4) NW Ecological basis for designing and implementing Marine Protected Areas (MPA) as part of a conservation or management program, and techniques used to evaluate effectiveness of MPA networks. Metapopulation and community structure, landscape ecology, spatial analysis, geographic information systems (GIS), sampling design, mapping, and monitoring methods. Recommended: Q SCI 381.

FISH 458 Fisheries Stock Assessment (4) NW *Francis* Emphasizes quantitative analysis of fisheries data to determine how the fishery would respond to alternative management actions. Major topics include production models, stock and recruitment, catch at age analysis, and formulation of harvest strategies. Recommended: either Q SCI 456 or FISH 456. Offered: jointly with Q SCI 458; Sp.

FISH 473 Limnology (3) NW Ecology, conservation, and management of inland aquatic

ecosystems. Explores interactions among biological, chemical, and physical features of lakes and other aquatic habitats. Prerequisite: either BIOL 102, BIOL 162, BIOL 18 0, or BIOL 203. Offered: jointly with BIOL 473.

FISH 474 Limnology Laboratory (2) NW Examination of biota of fresh waters, survey of limnological methods, analysis of data, and writing of scientific papers. Prerequisite: BIOL/FISH 473, which may be taken concurrently. Offered: jointly with BIOL 474; A.

FISH 475 Marine Mammalogy (3/5) NW Evolution, taxonomy, physiology, life history, and behavior of marine mammals; the techniques of studying and the management and conservation of them. Recommended: 15 credits of biological science, vertebrate anatomy, and physiology, for laboratory sections.

FISH 478 Topics in Sustainable Fisheries (3, max. 9) Parrish Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Pre-seminar discussion section focusing on select readings. Final paper. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics. Offered: jointly with BIOL/ENVIR 478.

FISH 480 Marine Resource Conservation and Management (3) I&S/NW *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with ENVIR 480/SMA 480.

FISH 490 Aquatic Microbiology (3/5) NW Basic principles of aquatic microbiology and aquatic microbial ecology: role and identity of aquatic microorganisms; introduction to modern methodologies for research. Laboratory work with local freshwater and marine samples for those enrolled in 5-credit section. Offered: jointly with MICROM 490; Sp, odd years. Recommended 15 credits of biological science, 10 credits of chemistry.

FISH 491 Aquatic Ecological Research in Alaska (12) NW Intensive, full-time research training experience where a team of students works on focused research problems guided by a group of faculty, postdoctoral, and graduate student mentors. Examines behavioral ecology, limnology, and population dynamics. Students also choose specific research questions for their own exploration. Course location: Alaska. Offered: S.

FISH 492 Friday Harbor Labs Apprenticeship (9/15) NW Intensive, full-time research training experience where teams of students work on focused research problems guided by a group of faculty, postdoctoral and graduate student mentors. Research questions vary. Course location: Friday Harbor Laboratories.

FISH 494 Capstone Project I (3-12, max. 24) Self-directed research or project under direction of a faculty member. Typically includes defining research question, determining methodology, data collection and analysis, writing a paper, and presenting findings. Course is first of two-quarter requirement for graduation for majors. May be taken concurrently with FISH 495, if approved. .

FISH 495 Capstone Project II (3) Self-directed research project under direction of a faculty member. Typically includes defining a research question, determining methodology, data collection and analysis, writing a paper, and presenting findings. May be taken concurrently with FISH 494 with permission of instructor.

FISH 496 Study Abroad: Aquatic and Fishery Sciences (1-15, max. 30) NW For participants in UW study abroad program. Specific content varies and must be individually evaluated. Credit not does not apply to major requirements without approval.

FISH 497 Special Topics in Aquatic and Fishery Sciences (1-15, max. 15) NW One-time offerings of topics in fisheries by resident or visiting faculty.

FISH 498 Internship/Experiential Learning (1-15, max. 15) Structured, practical training in the fishing industry, government agencies and other areas utilizing fisheries, food science, or quantitative science expertise. Experiences are supervised and evaluated. Written reports required. Credit/no credit only. Offered: AWSpS.

FISH 499 Undergraduate Research (1-15, max. 15) Individual research within the School of Aquatic and Fishery Sciences. Each project supervised by an individual faculty member. Written reports required.

FISH 504 Fish and Shellfish Pathology (5) Pathological effects of infectious and non-infectious diseases in fish and shellfish. Emphasis on immunological responses, contemporary diagnostic methods, control strategies, and environmental factors that influence disease transmission.

FISH 507 Special Topics in Fisheries (1-15, max. 15) Recommended: permission of instructor.

FISH 510 Current Topics in Genetics and Physiology (2, max. 8) Contemporary problems and issues in genetics and physiology as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 511 Current Topics in Evolution, Ecology, and Behavior (2, max. 8) Contemporary problems and issues in evolution, ecology and behavior as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 512 Current Topics in Quantitative Science (2, max. 8) Contemporary problems and issues in quantitative science as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 513 Current Topics in Management, Conservation, and Restoration (2, max. 8) Contemporary problems and issues in management, conservation, and restoration as they relate to fisheries and aquatic sciences. Topics vary. Credit/no credit only.

FISH 514 Current Topics Aquaculture, Utilization, and Pathology (2, max. 8) Contemporary problems and issues in aquaculture, utilization, and pathology as they relate to fisheries and aquatic sciences. Topic varies. Credit/no credit only.

FISH 521 Research Proposal Writing for Graduate Students (4) Practice in reading,

writing, critiquing, and evaluating research grant and contract proposals. Lecture and discussion of funding resources, structure of proposals, proposal review, evaluation criteria, and agency feedback. Examples of successful and unsuccessful grant applications. Preparing proposals and critiquing other's efforts.

FISH 522 Classical Literature of Fisheries Science and Aquaculture (2) Discussion of the classic literature of aquatic and fishery sciences. Both oral and writing communication skills stressed. Credit/no credit only. Offered: A.

FISH 525 Ecology and Behavior of Fishes (3) Basic principles of ecology and behavior (e.g., habitat associations, competition and predation, migrations and movements, reproductive patterns) as applied to fishes. Critical evaluation of current literature and fieldwork required. Recommended: 311 or equivalent or permission of instructor.

FISH 526 Advanced Fisheries Ecology II: Populations, Communities, and Ecosystems (5) Recent advances in the study of aquatic communities and ecosystems in relation to a number of contemporary issues in fisheries science and management. Focus on case histories drawn from freshwater, estuarine, and marine ecosystems. Emphasis on relationships between science and public policy in attempting to resolve these issues.

FISH 527 Aquatic Community Responses to Chemical Stress (3) Aquatic ecotoxicology; bridging the gap between physiological and ecosystem responses to toxic chemicals. Detecting effects against natural variability; altered species abundances and dominance, counter-intuitive responses. Case histories, controversies on data interpretation. Recommended: at least one course in ecology, limnology, oceanography or permission of instructor.

FISH 529 Topics in Streamside Studies (1) Discussion by invited speakers on current research related to streamside studies. Offered: jointly with CFR 529; AWSp.

FISH 530 Application of Bioenergetics Models to Aquatic Food Webs (4) Modeling framework quantifying bioenergetics, including consumption, growth, nutrient recycling and contaminant bioaccumulation; links physiology and behavior of individual organisms to ecological processes within populations and aquatic food webs. Common applications include estimating predation, carrying capacity, or growth potential in different habitats. Recommended: regression course.

FISH 535 Aquatic Toxicology (3) Principles of toxicology applied to aquatic organisms. Recognition of physiological and biochemical responses of organisms to toxins and practical application of toxicity testing methods to identification of pollution and toxins in aquatic environment. Toxicity test design, interpretation, and data analysis. Recommended: organic or biochemistry and physiology or equivalent or permission of instructor.

FISH 539 Forestry-Fisheries Interactions: Case Studies (3) Case studies of streamside management situation at the watershed and basin level. Topics include resource conflict resolution, current and future management alternatives, landscape dynamics, role of disturbance, and policy options. Prerequisite:

graduate standing in forestry, fisheries, or related field; undergraduates by permission of instructor. Offered: jointly with ESC 539.

FISH 542 Principles and Applications of Molecular Methods (3) Applications of molecular techniques to questions in ecology, evolution, and natural resource management, with emphasis on advanced genome-enabled technologies and the analysis and interpretation of genetic data. Includes weekly discussion of empirical papers, and preparation/peer-review of a proposal Prerequisite: permission of instructor. Offered: jointly with OCEAN 574; A.

FISH 543 Molecular Techniques (4) Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 or permission of instructor. Offered: jointly with OCEAN 575.

FISH 547 Stream and River Ecology (5) Characterizations of stream and river ecosystems from a watershed perspective. Emphasis on fundamental processes affecting the structure and dynamics of aquatic communities and the riparian zone. Resource conflicts, new technologies, field trips, and class projects. Offered: jointly with CFR 547; Sp.

FISH 548 Special Topics in Streamside Studies (2, max. 6) Contemporary problems and issues in forestry, fisheries, and wildlife management in watersheds. Topics vary, yet focus on interactions of land and water resources in the forests of the Pacific Northwest. Recommended: permission of instructor. Offered: jointly with ESC 548.

FISH 552 Current Topics in Aquatic Animal Nutrition (5) Nutrient requirements of finfish, shellfish, ornamental fish, and marine mammals for growth, development, and reproduction. Fish feed formulation techniques. Critical review of historical papers and current literature in aquatic animal nutrition. Offered: Sp.

FISH 556 Mathematical Analysis in Fisheries Stock Assessment (3) Analytic approaches to stock assessment and population management applications of parent-progeny models and logistic models; biological and economic yields of natural populations; analysis of population data on computers. Recommended: Q SCI 292, 392, 456, and 483 or permission of instructor.

FISH 557 Estimation of Population Parameters (4) Statistical analysis of population data; design and analysis of mark-recapture experiments on natural populations; laboratory work on computers. Recommended: probability theory and Q SCI 292 and 483.

FISH 558 Advanced Analysis in Fisheries Stock Assessment (3) Deterministic and stochastic representations of age-dependent and size-dependent models for stock assessment; analysis of multi-species models; risk analysis and uncertainty in fisheries management strategies; analysis of population data on computers. Recommended: 456, 458, 557, or permission of instructor.

FISH 565 Marine Fish Biology (9) Taxonomy, ecology, and life history of the fishes of the San Juan Islands and northeast Pacific Ocean. Prerequisite: permission of instructor. Offered: Friday Harbor Laboratories.

FISH 578 Graduate Topics in Sustainable Fisheries (2, max. 6) *Parrish* Seminar series featuring local, national and internationally known speakers in fisheries management and conservation. Case studies. Conservation/restoration in practice. Post-seminar discussion section led by speaker on topics covered in lecture. Topics may include harvest management, whaling, by-catch, salmon, marine protected areas, introduced species, citizen action, co-management, and marine ethics.

FISH 581 Fishery Management: Case Studies (3) Examination of historical case studies chosen to illustrate specific fishery management problem areas. Faculty presentations occupy first half of quarter, student presentations the second half. Prerequisite: FISH 580. Offered: jointly with SMA 581.

FISH 582 Fishery Management: Contemporary Issues (5) Focuses on multi-disciplinary, in-depth analysis of specific problems, including biological and economic assessments, evaluation of alternative management systems, and formulation of specific research, data collection, and management recommendations. Prerequisite: FISH 581. Offered: jointly with SMA 582.

FISH 600 Independent Study or Research (*) Credit/no credit only.

FISH 700 Master's Thesis (*) Credit/no credit only.

FISH 800 Doctoral Dissertation (*) Credit/no credit only.

School of Marine Affairs

SMA 103 Society and the Oceans (5) I&S/NW Explores the social and policy dimensions of the ocean environment and ocean management policy. Attention to how human values, institutions, culture, and history shape environmental issues and policy responses. Examines case studies and influential frameworks, such as the ocean as "tragedy of the commons". Offered: jointly with ENVIR/SIS 103.

SMA 433 Environmental Degradation in the Tropics (5) I&S/NW Considers theories and controversies of environmental degradation in the tropics, ecological and social case studies of Central American rain forests and Southeast Asian coral reefs, and implications of environmental management techniques. Offered: jointly with SIS 433/SMA 433.

SMA 455 Marine Business Environment in Russia and Eastern Europe (3) I&S *Kaczynski* International marine business environment of Russia and the maritime nations of East Europe; their transition process from communist to free market economic systems. Covers aspects of doing business in marine-related fields such as shipping, fisheries, shipbuilding, ports, and land infrastructures, marine tourism, and water sports. Offered: jointly with SISRE 455.

SMA 476 Introduction to Environmental Law and Process (3) I&S *Bryant, Hershman* Use and application of key statutes in marine living resources management. Overview of administrative law and process. Basic legal research, reading, and briefing selected judicial opinions. Participatory case study component. Designed for non-law graduate and advanced undergraduate students. Offered: jointly with ENVIR 476; A.

SMA 480 Marine Resource Conservation and Management (3) I&S/NW *Gallucci, Miller* Techniques and philosophy for conservation, management and development of harvested marine populations. Emphasis on integration of ecological, sociological, and economic dimensions of institutional decision making for policy formation in uncertain environments. Offered: jointly with FISH 480/ENVIR 480.

SMA 485 Pacific Recreation and Tourism Issues (3) I&S/NW *Miller* Examines how marine tourism links people to one another and to the environment. Utilizes concepts from cultural anthropology, sociology, political science, geography, ecology, conservation biology, and planning. Topics include: ecotourism, ethnic tourism, marine parks and protected area, fisheries, sustainable development, tourism ethics, and marine environmental education.

SMA 499 Undergraduate Research (1-15, max. 15) Research on assigned topics under the supervision of faculty members. Prerequisite: permission of instructor.

SMA 501 Integrated Marine Affairs Practice (3) Introduction to the practice of integrated assessment in marine affairs through the use of case studies and group analysis projects. Prerequisite: SMA 500 plus two of the following: SMA 519, SMA 536, SMA 591, or permission of instructor. Offered: A.

SMA 506 International Law of the Sea (3) Offered: jointly with LAW B 561.

SMA 507 International Organizations and Ocean Management (3) Miles Survey of the manner in which international regimes and organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of the effectiveness of regimes and of processes that support or constrain these organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with PB AF 538.

SMA 508 National Marine Policy Processes (3) Miles Comparative institutional dimensions of marine policy processes. Marine policy context at the national level and the dynamics that drive policy formulation and policy implementation.

SMA 509 Integrated Coastal Management (3) Christie, Hershman Managing multiple uses of coastal waters and the adjacent land; conflicts arising from competition for space and resources; organization, scientific, and economic problems associated with coastal management; planning and management experience in the United States and Southeast Asia. Prerequisite: SMA 500 or permission of instructor.

SMA 510 Topics in Marine Ecology (3) Klinger Study of ecological principles as they apply to marine species, populations, and ecosystems, using current examples from the primary literature, including contemporary issues such as species declines, species additions, pollution, and global change. Offered: W.

SMA 512 Interviewing Methods and Environmental Topics (3) Miller Focuses on qualitative techniques employed by social scientists and other researchers (e.g., sociologists, cultural anthropologists, political scientists, journalists, reporters) in interview situations. Students conduct interviews and limited participant observation with people in public, private, and activist sectors. Relevant to students with

interests in marine affairs, forestry, fisheries, and environmental studies.

SMA 514 Marine Pollution Management Issues (3) Leschine Management and policy aspects of marine environmental protection, emphasizing the two-way interaction between environmental managers and environmental and policy scientists which shapes policy.

SMA 515 U.S. Coastal and Ocean Law (4) Hershman Study of the legal framework in the United States controlling allocation and use of coastal and marine resources. Topics include coastal zone management, fisheries management, protection of marine mammals and endangered species, marine pollution, offshore oil and gas development, and marine transportation. Offered: jointly with LAW B 565.

SMA 516 Seaport Management (3) Role of port and harbor agencies in management of marine uses: cargo and trade, economic development, tourism and recreation, fisheries, environmental protection. Management functions of planning, marketing, finance, engineering, environmental assessment. Examples and guest speakers from Port of Seattle and other Puget Sound ports. Prerequisite: SMA 500 or permission of instructor.

SMA 517 Marine Uses: Transportation and Commerce (3) Hershman Role of the oceans in the transportation of people and materials, character and trends in vessel design and terminal facilities, pattern and nature of industry organization, regulations, economics of the shipping industry, management of fleets and vessels, individuals at sea and ashore, national policies affecting the merchant marine and port facilities. Prerequisite: SMA 500 or permission of instructor.

SMA 519 Marine Policy Analysis (3) Leschine Goal is appreciation for and basic working knowledge of techniques used in policy analysis. Techniques are explored in both quasi-realistic settings and in application to real world problems of marine policy.

SMA 521 Governmental Responses to Global Climate Change (3) Miles Exploration of major scientific, policy and legal issues pertaining to problems of global climate change including regime design, use of climate models, impact on hydrology water resources, and forests.

SMA 523 International Science and Technology Policy (3) Miles Analyzes the relationships between research and development policy, capabilities, and national technological strategies for advanced industrial and less-developed countries. Deals with international implications as countries make policies in regional and global organizations. Examples chosen from space telecommunication, weather and climate modification, airline transportation, nuclear energy, and seabed exploration.

SMA 525 Marine Protected Area Management and Science (3) Fluharty, Klinger Examines management and scientific issues involved with the design, establishment, operation, and maintenance of MPAs. Offered: Sp.

SMA 536 Applied Microeconomics for Marine Affairs (3) Huppert Acquaints students with microeconomic tools commonly employed in policy analysis. Emphasis is placed on mastery of basic concepts, definitions, and models useful to marine policy, including determinants of price

and outputs in competitive markets, effects of other market structures, market failure, and applied welfare economics.

SMA 537 Economic Aspects of Marine Policy (3) *Huppert* Development of pertinent economic concepts and their application to selected topics in marine policy decision making, including maritime policy, OCS oil and gas development, and wetlands management. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with ECON 537; W.

SMA 538 Economics of Living Marine Resources (3) *Huppert* Develops pertinent economic concepts and applications for conservation, regulation, and restoration of fisheries and other living resources. Gives special attention to fishery management, including harvest regulation and enforcement, recreational fisheries evaluation, property rights regimes, contemporary issues, and marine protected area management. Offered: jointly with ECON 538; Sp.

SMA 540 International Strategic Planning for Marine Resources (3) *Kaczynski* Marine economies are affected by shrinking resources, population pressure, expanding economic globalization. Case studies from the third world and economies in transition illustrate strategic economic planning. Students research selected topics. Prerequisite: SMA 500 or permission of instructor. Offered: A.

SMA 550 Special Topics in Marine Studies (1-3, max. 18) Examination of various aspects of marine studies. Content varies, depending upon the interests of the faculty and students. Intended for the joint participation by the faculty and advanced students in the investigation of selected topics. One or more groups are organized each quarter.

SMA 555 Comparative Marine Business in the North Pacific (3) Strategies of Russian, Canadian, Japanese, and American enterprises and governments in promotion of marine business in the North Pacific. Socio-economic characteristics of the four powers; role of public and private sectors in foreign trade and investment; Russia's transition to free-market economic system; and business practices in the region. Offered: jointly with SISRE 555.

SMA 570 Thesis Presentation (1) *Fluharty* Completion of the thesis requirement for SMA. Prepare a professional presentation to a peer audience. Offered: AWSpS.

SMA 581 Fishery Management: Case Studies (3) *Huppert* Examination of historical case studies chosen to illustrate specific fishery management problem areas. Faculty presentations occupy first half of quarter, student presentations the second half. Prerequisite: SMA 580 or permission of instructor. Offered: jointly with FISH 581.

SMA 585 Climate Impacts on the Pacific Northwest (4) *Mantua, Snover* Knowledge of past/future patterns of climate to improve Pacific Northwest resource management. Topics include the predictability of natural/human-caused climate changes; past societal reactions to climate impacts on water, fish, forest, and coastal resources; how climate and public policies interact to affect ecosystems and society. Offered: jointly with ATM S/ESS/ENVIR 585; Sp.

SMA 591 Marine Science in the Coastal Zone

(3) *Klinger* Presentation and analysis of the marine science of estuarine, coastal, and open ocean systems, including evaluation and interpretation of scientific information necessary for management. Lectures, discussions, and readings emphasize the relevance of natural processes to marine environmental management and decision-making. Offered: jointly with OCEAN 591; A.

SMA 600 Independent Study or Research (*).

SMA 700 Master's Thesis (*).

Oceanography

OCEAN 101 Survey of Oceanography (5) NW *Strickland* Holistic view of fundamental principles of ocean science; the geography and geology of ocean basins; chemistry of sea water; physical dynamics of currents, waves, and tides; coastal processes; and the biology of diverse ecosystems such as deep sea vents, coral reefs, and estuaries. Intended for nonmajors. Offered: A.

OCEAN 102 The Changing Oceans (5) I&S/NW Historical case studies of research on the ancient oceans, deep-sea exploration, climate change and the oceans, and human impacts on marine life. Students consider societal factors affecting progress in marine science, changing popular attitudes toward the oceans, and key current policy implications of marine science. Intended for nonmajors. Offered: W.

OCEAN 115 Astrobiology: Life in the Universe (5) NW Introduction to the new science of astrobiology, study of the origin and evolution of life on Earth, and the search for microbial and intelligent life elsewhere in the Universe. Designed for non-science, liberal arts majors. Offered: jointly with ASTBIO/ASTR/ESS 115/BIOL 114.

OCEAN 200 Introduction to Oceanography (3) NW *Armbrust* Description of the oceans. Emphasis on relations of biology, chemistry, geology, and physics in marine environments. Examination of relationships and interactions at macro-, meso-, and microscales in the ocean. Intended for science majors. Offered: Sp.

OCEAN 210 Ocean Circulation (3) NW The large-scale circulation of the ocean. Topics include temperature-salinity analysis; water mass identification; water, salt, and heat budgets; chemical tracer distributions; advection and diffusion. Prerequisite: either Ocean 101 or Ocean 200; either PHYS 114 or PHYS 121. Offered: A.

OCEAN 220 Introduction to Field Oceanography (3/5) NW Design and conduct a field study in oceanography. Field trip required (usually during Spring break). Focus on active learning, deployment of instruments, data collection, interpretation, and presentation. Honors section incorporates additional field experimentation and study in marine biology. Writing class. Prerequisite: either OCEAN 210 or OCEAN/FISH 250, BIOL 250. Offered: Sp.

OCEAN 230 Rivers and Beaches (3/5) NW *Montgomery, Nittrouer* Introduction to Earth surface environments, the processes that shape them, how humans affect them and are affected by them. Weekend field trips examine mountains, rivers, deltas/estuaries, beaches, and environments beyond. Focus on linkages between these environments to illustrate coupling between

landscapes and seascapes. Offered: jointly with ESS 230.

OCEAN 250 Marine Biology (3/5) I&S, NW Lecture-laboratory course in Marine Biology focusing on physical, biological, and social aspects of the marine environment. Topics include oceanography, ecology, physiology, behavior, conservation, fisheries, exploration, and activism. Evening marine biology movies and weekend field trip. Honors section research project. Offered: jointly with BIOL/FISH 250.

OCEAN 260 The Puget Sound Ecosystem (3/5) I&S/NW Examines historical human impacts on the land/water ecosystem of the Puget Sound, roles of regional governance and citizen action, and prospects for ecological restoration. Computer labs and field trips for additional credit. Offered: jointly with ENVIR 260.

OCEAN 300 Study Abroad Marine Sciences (1-12, max. 12) *Robigou* For participants of Marine Language Exchange Scholarship Program. Specific content varies and must be individually evaluated. Credit does not apply to major requirements without approval. Offered: AWSpS.

OCEAN 310 The Puget Sound Nearshore: Processes and Problems (3) I&S/NW An introduction to the geology, ecology, and politics of Puget Sound beaches. Content focuses on beach formation and sediment dynamics, with application to nearshore ecology and shoreline management. Three field trips to local beaches complement topics discussed in class.

OCEAN 351 Field Investigations in Marine Biology (5) Evaluates the relationships between man and marine systems in a field-oriented class. Case studies directly investigate marine biology. Studies include human activities and our effects on marine species and communities. Multiple field trips, lectures, and labs. Prerequisite: FISH 350/OCEAN 350. Offered: jointly with FISH 351; Sp.

OCEAN 360 Marine Field Research (10) NW,QSR *Scott Veirs, Val Veirs* Intensive off-campus marine research experience. Includes 5 weeks designing a field experiment and a 5-week cruise aboard a sailing research vessel to implement it. Offered: jointly with OCEAN 365; ASp.

OCEAN 365 Practicing Sustainability Science (8) I&S/NW *Scott Veirs, Val Veirs* Intensive off-campus experience. Studies sustainability science, marine policy, and "clean" technologies. Includes interaction with community stakeholders for 5 weeks and experimentation with sustainable technologies and practices in the marine environment during a 5-week cruise aboard an energy-efficient sailing catamaran. Offered: jointly with OCEAN 360; ASp.

OCEAN 400 Chemical Oceanography (4) NW Physical and chemical properties of seawater and marine products; processes determining the chemical makeup of the oceans. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155; either OCEAN 202 or OCEAN 210. Offered: W.

OCEAN 401 Special Topics in Chemical Oceanography (3) NW.

OCEAN 410 Marine Geology and Geophysics (4) NW Sedimentological and petrologic processes that determine the geologic record. Prerequisite: either ESS 101 or ESS 210. Offered: A, jointly listed with ESS 410.

OCEAN 411 Special Topics in Marine Geology and Geophysics (3) NW .

OCEAN 420 Physical Processes in the Ocean (4) NW Physical properties and processes of the ocean: methods of describing ocean currents, waves, tides and mixing and their effect on movement of water parcels. Prerequisite: either PHYS 116 or PHYS 123; either MATH 126, MATH 129, MATH 146, or Q SCI 293; either OCEAN 202 or OCEAN 210. Offered: W.

OCEAN 421 Special Topics in Physical Oceanography (3) NW .

OCEAN 422 Ocean Dynamics (3) NW Equations of motion governing flow of sea water. Conservation of mass, tracers, heat and momentum. Energy and vorticity balance. Buoyancy and rotational effects. Scale analysis. Applications to upper ocean dynamics, surface and internal waves, and wind-driven currents in the ocean. Prerequisite: MATH 126; PHYS 123; OCEAN 420. .

OCEAN 423 Ocean Circulation and Climate (3) NW Quantitative treatment of ocean basin to global scale ocean circulation systems and their interaction with climate variability. Prerequisite: PHYS 123; either MATH 126 or MATH 129; OCEAN 401.

OCEAN 430 Biological Oceanography (4) NW Marine organisms, their quantitative distribution in time and space and their interactions with the ocean. Prerequisite: either BIOL 102, BIOL 203, or BIOL 220; either OCEAN 202 or OCEAN 210. Offered: A.

OCEAN 431 Special Topics in Biological Oceanography (3) NW .

OCEAN 442 Oceanography of the Puget Sound (3) NW Explores the role of oceanography in regional issues. Field opportunities and active investigation of applied oceanographic problems. Lectures, research trip, student co-teaching, discussion. Prerequisite: either CHEM 221, BIOL 203, BIOL 220, ESS 210, or GEOL 205; either OCEAN 430 or OCEAN 433. Offered: A.

OCEAN 443 Design of Oceanographic Field Experiments (3) NW Case histories, presentations, and class exercises used to teach methods of formulating a research problem and proposal writing. Methods of data analysis, presentation, error estimation, library resource and data base use; web page implementation and design. Principles of cruise planning. Prerequisite: OCEAN 400; OCEAN 410; OCEAN 420; OCEAN 430; OCEAN 442. Offered: W.

OCEAN 444 Advanced Field Oceanography (5) NW Conduct field experiment (designed in OCEAN 443) during a week-long cruise aboard a research vessel. Analyze samples data and present results in a series of drafts and a final term paper. Results are presented at a two-day-long public research symposium and on the students' individual Web sites. Prerequisite: OCEAN 443. Offered: Sp.

OCEAN 450 Climatic Extremes (4) NW Course examines earth history for extreme climatic conditions to predict future climate changes. Numerical climate models use PC-based computer programs to identify processes and feedbacks that control climate. Prerequisite: MATH 125, MATH 145, or Q SCI 292; and PHYS 115 or PHYS 122.

OCEAN 451 Fluid Dynamics Laboratory (4) NW Individual projects in experimental fluid dynamics with applications to practical problems. Experimental design, visualization, and measurement techniques applied to a problem selected by each student. Prerequisite: PHYS 123.

OCEAN 452 Spatial information Technologies in Ecosystem Sciences (3) NW *Logsdon* Introduction to the use of GPS, GIS, and Remote Sensing in the ecosystem sciences. Integrates these technologies in an applied research setting. Two overnight weekend field trips required. Offered: jointly with FISH 453; A.

OCEAN 454 Hydrothermal Systems: An Interdisciplinary View (3) NW *Lilley* Provides a general, interdisciplinary overview of seafloor hydrothermal systems including important geological, chemical and biological processes. Topics include tectonic and volcanic controls on hydrothermal systems, water/rock reactions, phase separation, temporal variability, fluxes to the deep sea, micro- and macro biology. Offered: Sp.

OCEAN 499 Undergraduate Research (1-15, max. 24) Research on assigned topics that may involve laboratory work, fieldwork, or literature surveys. Offered: A/WSpS.

OCEAN 500 Current Problems in Oceanography (1) Discussion of research topics that are currently being investigated within the school. Credit/no credit only. Prerequisite: permission of instructor. Offered: AW.

OCEAN 501 Estuarine Circulation and Mixing (3) Observed patterns of currents, mixing, and stratification from deep fjords to shallow coastal plain estuaries. Physical understanding of basic processes, such as tides, wind stress, topographic effects on turbulence, sill hydraulics, and exchange flow. Vertical mixing and residence times important to biological and pollution studies. Prerequisite: permission of instructor.

OCEAN 506 Interdisciplinary Seminar in Oceanography (1-3, max. 12) Lectures, discussions, and work on selected problems of an interdisciplinary nature. Prerequisite: permission of instructor.

OCEAN 509 Seminar (1) Introduction to current research topics for beginning graduate students. Credit/no credit only. Offered: A/WSp.

OCEAN 510 Physics of Ocean Circulation (3) Structure of ocean basins; physical properties of seawater and the equation of state; heat, salt, fresh water budgets; tidal potential; Coriolis effect and geostrophic balance; major current systems and water masses; mixing, stirring in the ocean; simple waves; modern experimental methods in physical oceanography. Prerequisite: permission of instructor. Offered: A.

OCEAN 511 Introduction to Fluid Dynamics (4) Eulerian equations for mass-motion; Navier-Stokes equation for viscous fluids, Cartesian tensors, stress-strain relations; Kelvin's theorem, vortex dynamics; potential flows, flows with high-low Reynolds numbers; boundary layers, introduction to singular perturbation techniques; water waves; linear instability theory. Prerequisite: AMATH 403 or permission of instructor. Offered: jointly with AMATH/ATM S 505; A.

OCEAN 512 Geophysical Fluid Dynamics I (4) Dynamics of rotating stratified fluid flow in the

atmosphere/ocean and laboratory analogues. Equations of state, compressibility, Boussinesq approximation. Geostrophic balance, Rossby number. Poincare, Kelvin, Rossby waves, geostrophic adjustment. Ekman layers. Continuously stratified dynamics: Inertia-gravity waves, potential vorticity, quasigeostrophy. Prerequisite: OCEAN 511 or ATM S/AMATH 505. Offered: jointly with ATM S 509; W.

OCEAN 513 Geophysical Fluid Dynamics II (3) Theories, models of large-scale dynamics of oceans, atmospheres. Potential vorticity, Q principles; Rossby waves, ray tracing, Green's function, setup of general circulation; atmospheric "channels" versus ocean "basins"; wave-mean flow interaction, mountain drag, internal momentum flux; "Lagrangian" motion of particles, tracers; cascades, eddy flux of heat, moisture, Q. Prerequisite: OCEAN 512. Offered: Sp.

OCEAN 514 Waves (3) Application of marine hydrodynamics principles to wave motion in oceans. Offered: W.

OCEAN 515 Ocean Circulation: Observations (3) Modern large- and mesoscale ocean observations, interpreted in terms of contemporary circulation theories. Spectrum of temporal variability; eddies and eddy fluxes; ventilation; advection and diffusion in the abyss; transports of heat and salt; climatic scale of variability; modern methods for determining circulation. Prerequisite: OCEAN 510 or permission of instructor. Offered: Sp.

OCEAN 516 Ocean Circulation: Theories (3) Hydrodynamic theories concerning origin and characteristics of major ocean currents. Prerequisite: OCEAN 512 or permission of instructor.

OCEAN 517 Methods and Measurements in Physical Oceanography (2) Principal instruments and experimental methods of physical oceanography. Devices and systems that measure pressure, temperature, electrical conductivity, sea state, and velocity. Prerequisite: permission of instructor. Offered: alternate years.

OCEAN 519 Seminar in Physical Oceanography (1, max. 9) Discussion of selected problems of current interest in physical oceanography. Prerequisite: OCEAN 510 or permission of instructor.

OCEAN 520 Marine Chemistry (3) Processes controlling the chemical composition of seawater. Chemical distributions in the ocean, marine physical chemistry, chemical equilibrium, and concepts of mass balance. Mechanisms and models used to explain distributions of stable and radioactive isotopes, gases, trace metals, and biochemicals in the world's oceans. Offered: A.

OCEAN 521 Aquatic Chemistry (3) Application of physical chemistry and thermodynamics to processes that control chemical composition of natural waters. Equilibrium approach. Acid/base chemistry, the carbonate system, dissolution and precipitation, metal ions in solution, oxidation-reduction chemistry, silicate mineral reactions. Prerequisite: OCEAN 520 or permission of instructor. Offered: A.

OCEAN 522 Marine Organic Geochemistry (3) Sources, reactions, and fates of organic molecules in the marine environment along with the stable isotope geochemistry of marine organic substances. Prerequisite: CHEM 237 and CHEM 239 or permission of instructor.

OCEAN 523 Geochemical Cycles (4)

Descriptive, quantitative aspects of earth as biogeochemical system. Study of equilibria, transport processes, chemical kinetics, biological processes; their application to carbon, sulfur, nitrogen, phosphorus, other elemental cycles. Stability of biogeochemical systems; nature of human perturbations of their dynamics. Prerequisite: permission of instructor. Offered: jointly with CHEM 523 and ATM S 508.

OCEAN 524 Environmental Chemical

Modeling (3) *Benjamin, Murray* Physical/chemical principles controlling the fate and distribution of environmental pollutants, and use of models to apply those principles. Includes modeling of physical transport in conjunction with chemical equilibrium and reaction kinetics. Applications include acid mine drainage, acid deposition, and groundwater and lake water contamination. Offered: jointly with CEE 550.

OCEAN 529 Seminar on Chemical Oceanography (*, max. 9)

Lectures, discussions, and readings on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

OCEAN 530 Biological Oceanography:

Bacteria and Protozoa (3) Bacteria in the marine environment; fate of organic carbon in the ocean and the interrelationship of the carbon cycle with other biogeochemical cycles. Prerequisite: permission of instructor. Offered: W.

OCEAN 531 Biological Oceanography:

Phytoplankton (3) Phytoplankton in the marine environment: ecology, primary productivity, and physiology. Phytoplankton growth and photosynthetic patterns; spatial and temporal distributions of phytoplankton; methods for determining distributions and rates of production and growth. Prerequisite: permission of instructor. Offered: W.

OCEAN 532 Biological Oceanography:

Zooplankton (3) Distribution and abundance of pelagic animals in space and time; analysis of their interactions. Small-scale distributions and behavior, population dynamics and energetics, trophic structure and dynamics, pelagic community structure, models of populations and food chains, secondary production and biogeography. Prerequisite: permission of instructor. Offered: Sp.

OCEAN 533 Biological Oceanography:

Benthos (3) Analysis of marine benthic communities; new research questions and method; ecologically important physics of benthic boundary layer; theories, mechanics, and observations of deposit feeding; succession as consequence of physical processes and biological interactions. Environments include deep-sea, continental shelves, estuaries, and intertidal, focusing on soft substrata. Prerequisite: permission of instructor. Offered: Sp.

OCEAN 534 Methods and Measurements in

Biological Oceanography (2) Methods for bacteria, phytoplankton, and zooplankton population assessment. Rate measurements of phytoplankton, zooplankton, and bacterial production. Benthos measurements, including deep-sea environments. Prerequisite: permission of instructor.

OCEAN 535 Biological Oceanography: An

Overview (3) Principles and practice of biological oceanography for students with strong background in physical sciences but little recent exposure to biology. Ecological principles at

individual, population, and community levels; overview of discipline of biological oceanography; case studies of interdisciplinary problems shared with the physical sciences. Offered: W.

OCEAN 536 Seminar in Geostatistics (1-3,

max. 3) Lectures and discussions on selected problems in the applications of statistics in earth science.

OCEAN 539 Seminar in Biological Oceanography (*, max. 9)

Lectures, discussions, and work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

OCEAN 540 Marine Geological Processes (3)

McDuff, Russ Principles of thermodynamics, heat and mass transfer, fluid mechanics, continuum mechanics, and time-series analysis applied to marine geological and geophysical data with special applications to thermal balance of the oceanic lithosphere. Offered: W.

OCEAN 541 Marine Sedimentary Processes

(3) Investigates fundamental process of marine sedimentation, including equations characterizing boundary-shear flows, initiation of grain motion, bedload and suspended-load transport, and sediment accumulation. Applies concepts to sediment dispersal in rivers, deltas, estuaries, beaches, continental shelves, slopes, and rises, with emphasis on the relationships between active processes and resulting deposits.

OCEAN 542 Sediment Dynamics and

Boundary-Layer Physics (4) *Parsons* Theoretical descriptions of sediment transport processes constrained by laboratory demonstrations. The physics of boundary layers, initiation of motion, suspended load, bedload, bedforms, and continua transport (turbidity currents, debris flows, and suspensions) and its application to the geological record. Offered: jointly with ESS 526; W.

OCEAN 545 Physics of the Oceanic Lithosphere (3)

Basic principles of elasticity, fluid flow, and heat transport with specific applications to the formation and evolution of the oceanic lithosphere. Includes deformation of the earth, flow in porous media, heat transport, and marine seismological and potential field techniques. Prerequisite: OCEAN 540. Offered: jointly with ESS 568.

OCEAN 546 Continental-Margin Sedimentation (3)

Detailed evaluation of recent studies in processes forming strata on continental margins, including the diverse time scales ranging from sediment transport to sequence stratigraphy. Highlights the linkages with physical oceanographic processes, the fates of geochemical components, and the relationship to biological communities. Offered: jointly with ESS 527.

OCEAN 549 Seminar in Geological and

Geophysical Oceanography (*, max. 9)

Lectures, discussions, and field and laboratory work on selected problems of current interest. Prerequisite: permission of instructor. Offered: AWSp.

OCEAN 550 Geochemistry and Geophysics of

Melt Generation (3) Mantle flow beneath mid-ocean ridges and hotspots, major element systematics, constraints from trace elements and isotopes on melting and mantle reservoirs, melt extraction, and crustal thickness and axial topography. Prerequisite: OCEAN 544 or permission of instructor. Offered: alternate years.

OCEAN 551 Marine Seismology (3) Practical application of seismic techniques to the study of the ocean basins. Analysis of refraction data, multichannel reflection profiling, surface wave studies, and earthquake analysis. Prerequisite: GPHYS 502 or permission of instructor. Offered: jointly with GPHYS 551.

OCEAN 552 Seminar in Geophysics and

Geological Data Analysis (1) Practical geophysical data analysis, map projections, gridding multibeam bathymetry processing, gravity and magnetic anomalies, downward continuation, magnetic inversion, seismic refraction and reflection, and microearthquake locations. Prerequisite: permission of instructor.

OCEAN 559 Advanced Seminar on Mid-Ocean

Ridge Processes (*, max. 9) Lectures, discussions, and practical work on selected topics of current interest in mid-ocean ridge research. Prerequisite: permission of instructor.

OCEAN 560 Atmosphere/Ocean Interactions

(3) Observations and theory of phenomena of the coupled atmosphere-ocean system. El Nino/Southern Oscillation; decadal tropical variability; atmospheric teleconnections; midlatitude atmosphere-ocean variability. Overview of essential ocean and atmospheric dynamics, where appropriate. Credit/no credit only. Prerequisite: ATM S 509 or OCEAN 512. Offered: jointly with ATM S 560; alternate years; Sp.

OCEAN 569 Topics in Physical Oceanography

(1-4, max. 9) Lecture series on topics of major importance in physical oceanography. Offered: AWSp.

OCEAN 570 Marine Microbial Interactions (1-

3, max. 9) Structure, function, and dynamics of natural mixed-species populations of marine bacteria and their interactions with higher organisms; mixed-species culture methods; synecological field methods; species assemblages in specialized environments; mutualisms; sites and patterns of genetic exchange. Prerequisite: OCEAN 530 or permission of instructor. Offered: alternate years.

OCEAN 571 Marine Primary Productivity (1-3,

max. 9) Patterns and mechanisms of marine phytoplankton primary production. Small-to-global-scale patterns of production; environmental regulation of production; absorption of electromagnetic radiation; fluorescence; carbon fixation; trophic interactions; remote sensing and other optical methods. Prerequisite: OCEAN 531 or permission of instructor. Offered: alternate years.

OCEAN 572 Zooplankton Ecology (1-3, max.

9) Life history strategies, dynamics and production of populations, vertical migration, interspecific interactions and community structure, models of complex assemblages of zooplankton, sampling methods and analysis, spatial heterogeneity. Prerequisite: OCEAN 532 or permission of instructor. Offered: alternate years.

OCEAN 573 Benthic Biological Processes (1-

3, max. 9) Processes characteristic of soft-bottom benthic environments; areas and methods of rapid current progress; open research questions; deposit feeding; passive larval recruitment; physical, chemical, geological, and biological feedbacks in ecological succession; scaling of laboratory systems. Prerequisite: OCEAN 533 or permission of instructor. Offered: alternate years.

OCEAN 574 Principles and Applications of Molecular Methods (3) Applications of molecular techniques to questions in ecology, evolution, and natural resource management, with emphasis on advanced genome-enabled technologies and the analysis and interpretation of genetic data. Includes weekly discussion of empirical papers, and preparation/peer-review of a proposal. Prerequisite: permission of instructor. Offered: jointly with FISH 542; A.

OCEAN 575 Molecular Techniques (4) Laboratory on DNA methods. Experiments analyzing genetic variation at the intra- and interspecific level, including one experiment of student's own design. Techniques include DNA extraction and quantitation, PCR, DNA sequencing, RFLP analysis and cloning. Prerequisite: FISH 542 or OCEAN 574 or permission of instructor. Offered: jointly with FISH 543; W.

OCEAN 578 Advanced Topics in Biological Oceanography (*, max. 18) Specialized research areas. Topic varies each year. Offered at Friday Harbor Laboratories. Prerequisite: permission of director of Friday Harbor Laboratories. Offered: S.

OCEAN 580 Aquatic Kinetics (3) Reaction rates and mass transport in water. Theories of chemical kinetics; experimental results from: CO₂ hydrolysis, Fe, Mn, and H₂S oxidation, stable isotope fractionation, mineral dissolution; homogeneous, heterogeneous, microbial catalysis; reaction and transport at air-water, sediment-water, and O₂/H₂S interfaces. Prerequisite: permission of instructor.

OCEAN 581 Geochemical Modeling (3) Background to modeling concepts frequently encountered in chemical oceanography: box models, advection-diffusion problems, sediment diagenesis equations, and boundary layer (air-water and sediment-water interface) models. Problems requiring application of the models to chemical distributions in the ocean. Prerequisite: permission of instructor.

OCEAN 582 River Basin Biogeochemistry (3) The function of rivers and river basins in transporting materials to the oceans and their

importance in biogeochemical cycles. Origin of water and water routing within drainage basins, sources and modification of dissolved and particulate materials in transport, ecological theory, and estuarine mixing zone transformations. Prerequisite: permission of instructor.

OCEAN 583 Isotope Biogeochemistry (3) The use of stable isotopes to study biogeochemical cycles in the oceans and atmosphere; specifically carbon, nitrogen, and sulfur cycles. Isotopic effects during photosynthesis, respiration, organic matter degradation. CaCO₃ dissolution, methanogenesis, nitrification/denitrification, and sulfate reduction. Prerequisite: permission of instructor.

OCEAN 584 Ocean Tracers and Mixing (3) The applications of tracers to studies of ocean circulation and ventilation. Processes within the ocean for which tracers have provided important information include gas exchange, mixed layer dynamics, thermocline ventilation, deep water formation and spreading, and mixing. Knowledge of partial differential equations suggested.

OCEAN 585 Paleooceanography (3) History of environmental changes on earth over the past 100 million years as reconstructed from records in deep-sea sediments, ice sheets, and other ocean/terrestrial substrates. Examination of isotopic, geochemical, micropaleontological, and dating techniques. Role of the ocean in climate change. Prerequisite: permission of instructor.

OCEAN 586 Current Research in Climate Change (2, max. 20) Weekly lectures focusing on a particular aspect of climate (topic to change each year) from invited speakers (both UW and outside), plus one or two keynote speakers, followed by class discussion. Offered: jointly with ATM S 586/ESS 586.

OCEAN 587 Climate Dynamics (3) *Hartman, Thompson* Examines Earth's climate system; distribution of temperature, precipitation, wind, ice, salinity, and ocean currents; fundamental processes determining Earth's climate; energy and constituent transport mechanisms; climate sensitivity; natural climate variability on interannual to decadal time scales; global climate models; predicting future climate. Offered: jointly

with ATM S 587/ESS 587. Offered: A.

OCEAN 588 The Global Carbon Cycle and Climate (3) *Quay* Oceanic and terrestrial biogeochemical processes controlling atmospheric CO₂ and other greenhouse gases. Records of past changes in the earth's carbon cycle from geological, oceanographic and terrestrial archives. Anthropogenic perturbations to cycles. Develop simple box models, discuss results of complex models. Offered: jointly with ATM S 588/ESS 588. Offered: W.

OCEAN 589 Paleoclimatology: Data, Modeling and Theory (3) *Battisti, Emerson, Steig* Evidence for past changes in land and sea surface temperature, in precipitation and atmospheric dynamics, and in ocean circulation: both long and interannual timescales. Paleoclimate modeling and theory. Time series analysis and climate noise. Rapid climate change. Statistical reconstruction of interannual variability. Offered: jointly with ATM S 589/ESS 589. Offered: Sp.

OCEAN 590 Advanced Topics in Oceanography (9-18, max. 18) Advanced topics examining specialized and interdisciplinary areas of oceanographic research. Offered at Friday Harbor Laboratories. Prerequisite: permission of Director of Friday Harbor Laboratories. Offered: S.

OCEAN 591 Marine Science in the Coastal Zone (3) *Klinger* Presentation and analysis of the marine science of estuarine, coastal, and open ocean systems, including evaluation and interpretation of scientific information necessary for management. Lectures, discussions, and readings emphasize the relevance of natural processes to marine environmental management and decision-making. Offered: jointly with SMA 591; A.

OCEAN 600 Independent Study or Research (*) Offered: AWSpS.

OCEAN 700 Master's Thesis (*) Offered: AWSpS.

OCEAN 800 Doctoral Dissertation (*) Offered: AWSpS.

School of Pharmacy

Medicinal Chemistry

MEDCH 400 Fundamental Concepts in Medicinal Chemistry (3) *W. Nelson* Principles of physical organic chemistry; chemical bonding, stereochemistry, acids/bases, and reaction mechanisms relevant to processes such as drug distribution, specificity, and metabolism. Prerequisite: either CHEM 239 or CHEM 337. Offered: A.

MEDCH 401 Immunizing and Antimicrobial Agents (4) *Daggett, Elmer* Chemical and biologic properties of agents used to prevent or treat infectious diseases, including diagnostic, prophylactic, and therapeutic uses of immunizing biologicals and spectrum, action mechanisms, resistance patterns, toxicity, and therapeutic applications of antibiotics, antifungals, and antivirals. Prerequisite: MICROM 301, MICROM 302, MEDCH 450, or equivalent, PharmD major, or permission of instructor. Offered: Sp.

MEDCH 402 Medicinal Chemistry (3) *S. Nelson* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam. Offered: A.

MEDCH 403 Medicinal Chemistry (3) *W. Nelson, Rettie* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam. Offered: W.

MEDCH 404 Medicinal Chemistry (3) *Atkins, W. Nelson* Study of the various classes of medicinal compounds with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: MEDCH 400 or satisfactory completion of qualifying exam. Offered: Sp.

MEDCH 420 Alternative and Complementary Medicines (2) *Elmer* Study of popular alternative and complementary medicines used in the United States. Focus on herbal products with some coverage of homeopathic and other non-nutritional dietary supplements. Demonstration of resources for current objective information on these controversial medicines. Credit/no credit only. Offered: A.

MEDCH 435 Diagnostic Medicinal Chemistry (3) *S. Nelson* Examination of clinical diagnostic tests with regard to the chemical or biochemical rationale of the testing method, interpretation of test results, and major factors influencing test values with special emphasis on the effects of medications. Clinical laboratory data from patients considered in light of these factors. Prerequisite: MEDCH 451 or BIOC 406 or equivalent, or permission of instructor. Offered: W.

MEDCH 450 Medicinal Biochemistry I (3) *Campbell, Kunze* Introduction to biochemistry for

Pharm.D. students with an emphasis on those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: W.

MEDCH 451 Medicinal Biochemistry II (3) *Campbell, Kunze* Continuation of discussions of those aspects of biochemistry which are particularly relevant to understanding human disease and therapeutic intervention strategies. Offered: Sp.

MEDCH 495 Special Studies in Medicinal Chemistry (*, max. 6) Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 499 Independent Study/Research (*, max. 24) Research problems in medicinal chemistry. Prerequisite: cumulative GPA of 2.50 and permission of instructor. Offered: AWSpS.

MEDCH 501 Advanced Medicinal Chemistry (4) *S. Nelson* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 502 Advanced Medicinal Chemistry (4) *W. Nelson, Rettie* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 503 Advanced Medicinal Chemistry (4) *Atkins, W. Nelson* Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 520 Seminar (1, max. 15) Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with PCEUT 520; AWSpS.

MEDCH 521 Advanced Medicinal Chemistry (3) *Atkins, W. Nelson* Application of integrated data from the physical and biological sciences to problems of chemotherapy, including transport of drugs to site of action, biotransformation of drugs, interaction of drugs with enzyme systems, and recent advances in drug design. Prerequisite: CHEM 457, CHEM 531, and BIOC 442, or permission of instructor. Offered: Sp.

MEDCH 527 Drug Metabolism (4) *Rettie, Thummel* Considerations of the biochemical mechanisms for the biotransformation of drugs and foreign compounds. Includes reaction mechanisms, ultrastructural considerations, induction mechanisms, methodology, kinetics of inhibition and activation, steroid and amine metabolism. Offered: jointly with PHCOL 527; odd years; W.

MEDCH 528 Proteins in Therapy and Disease (2) *Atkins, Daggett* Examination of enzyme catalysis and of protein structure and dynamics. Principles applied to topics of therapeutic relevance including: peptides and proteins as drugs, structure-based drug design, drug metabolism, protein engineering, and role of mutant or incorrectly folded proteins in disease states. Prerequisite: comprehensive course in biochemistry or consent of instructor. Offered: even years; W.

MEDCH 530 Mass Spectrometry of Drugs, Toxicants, and Metabolites (3) *Howald* Current approaches to the combination of liquid chromatography with mass spectrometry for small molecules. Mass spectrometry of drugs, toxicants, metabolites. Emphasis on interpretation skills, with problem sets each week. Introduction to LC/MS instrumentation. Ionization methods appropriate for small molecules. Capillary LC/MS and capillary electrophoresis. Offered: odd years; Sp.

MEDCH 541 Mass Spectrometry Based Proteomics (3) Covers basics of sample preparation, data generation, instrumentation, ionization, and data interpretation of peptide tandem mass spectra manually. Uses database search engines and bioinformatics in systems biology related proteomics. Prerequisite: MEDCH 530 or permission of instructor. Offered: odd years; Sp.

MEDCH 550 Mechanistic Studies in Medicinal Chemistry (1) *S. Nelson* Discussion of research strategies and methods used to carry out studies of mechanisms of drug action, metabolism, and toxicities. Emphasis is on problem solving through theoretical and experimental approaches and on data analysis and interpretation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 551 Flavin and Heme-Containing Monooxygenases (1) *Rettie* Discussion of research strategies and methodologies concerning the structure, function, and polymorphic expression of human monooxygenases, especially the cytochrome P450s and flavin-containing monooxygenases. Emphasis placed on experimental problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 552 Medicinal Chemistry Aspects of Drug Action and Drug Metabolism (1) *W. Nelson* Discussion of research strategies, methodologies, and literature concerning the mechanisms of drug action and drug metabolism, particularly as these apply to opiate drugs and beta blockers. Emphases placed on problem solving, data analysis, and presentation. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 553 Structure and Function of Macromolecular Protein Assemblies (1) *Atkins* Discussion of research strategies, methods, and current literature concerning macromolecular self-assembly processes and protein-protein interactions as they relate to biological specificity. Emphasis on experimental approaches used in current literature. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSpS.

MEDCH 554 The Mechanism of Action and Pharmacokinetics of Biotherapeutic Agents and Other Natural Products (1) *Elmer*

Discussion of the literature, research possibilities, and questions that need to be addressed in the area of the application of microorganisms and other natural products for therapeutic purposes. Emphases on problem solving, research strategies, literature evaluation, and data analysis. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

MEDCH 555 Current Topics in Biological Mass Spectrometry (1) *Goodlett* Emphasis on applications in the area of protein toxins, bioactive peptides, and microbial diseases and on current developments in the use of small scale separations with mass spectrometry. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

MEDCH 556 Mechanistic Aspects of Drug Metabolism (1) Discussion of research strategies methodologies and new approaches with regard to elucidating the chemical mechanisms and enzymology of metabolic reactions catalyzed by cytochrome P-450. Emphasis on trying to develop in vitro techniques which are predictive of in vivo drug behavior. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

MEDCH 557 Molecular Modeling Studies of Medicinal Chemistry (1) *Daggett* Discussion of research strategies, simulation methodologies, and literature concerning protein and peptide structure, function, dynamics, and folding. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWPpS.

MEDCH 558 Human Cytochrome P-450 Biochemistry (1) *Kunze* Presentation and discussion of research strategies and methodologies related to current problems in human drug metabolism by cytochrome P-450 enzymes. Emphasis on hypothesis testing and experimental problem solving in the areas of enzyme kinetics and mechanism. Credit/no credit only. Prerequisite: permission of instructor. Offered: even years; AWPpS.

MEDCH 559 Protein NMR Spectroscopy (1) *Campbell* Combines a comprehensive theoretical treatment of high resolution NMR spectroscopy with a practical description of the experimental techniques applicable to proteins and other biological macromolecules. Offered: AWPpS.

MEDCH 582 Topics in Medicinal Chemistry (1, max. 10) Discussion of pertinent articles from current literature. Offered: AWPpS.

MEDCH 590 Doctor of Pharmacy Thesis (1) Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

MEDCH 599 Cumulative Exams for Medicinal Chemistry (1) Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWPpS.

MEDCH 600 Independent Study or Research (*) Credit/no credit only. Offered: AWPpS.

MEDCH 700 Master's Thesis (*) Credit/no credit only. Offered: AWPpS.

MEDCH 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWPpS.

Pharmaceutics

PCEUT 331 Pharmaceutical Formulation: Principles and Dosage Forms (4) *Bloedow, Lee, Mao, Unadkat, Wang* Physicochemical principles involved in formulating stable dosage forms suitable for human administration. Hands-on laboratory experience with formulating extemporaneous preparations routinely encountered in community and hospital pharmacies. Offered: A.

PCEUT 405 Clinical Pharmacokinetics (5) *Anderson, Levy* Basic principles of pharmacokinetics and their application to the clinical setting, including: single-dose intravenous and oral kinetics, multiple dosing, nonlinear pharmacokinetics, metabolite kinetics, pharmacogenetics, and the role of disease in drug clearance and dose requirements, and kinetics of drug-drug interactions. Prerequisite: PCEUT 331. Offered: W.

PCEUT 406 Biopharmaceutics and Drug Delivery (3) *Ho, Levy, Shen, Thummel* Basic principles of biopharmaceutics and drug delivery, and their application to therapeutics including oral and non-oral route of drug administration for traditional and biotechnology drugs. Fundamental principles related to assessment of bioavailability and bioequivalence, drug-drug and food-drug interactions for orally administered drugs. Prerequisite: PCEUT 405. Offered: Sp.

PCEUT 495 Special Studies in Pharmaceutics (*, max. 6) Opportunity to expand the breadth and depth of understanding in specific areas. Credit/no credit only. Prerequisite: Permission of instructor. Offered: AWPpS.

PCEUT 499 Undergraduate Research (1-6, max. 12) Research problems in drug disposition, drug targeting, and drug development. Prerequisite: Cumulative GPA of 2.5 and permission of the instructor. Offered: AWPpS.

PCEUT 501 Advanced Pharmacokinetics I (5) *Ho, Shen, Unadkat* Drug absorption, distribution, excretion, metabolism, and effects in mammalian systems. Compartmental model and model-independent approaches examined. Drug disposition studied in a physiologically realistic context taking nonlinear events into account. Aimed at development of innovative methods for data analysis and evaluation in biological systems. Prerequisite: PCEUT 405 or PCEUT 506, or permission of instructor. Offered: Sp.

PCEUT 502 Pharmacokinetics of Drug Metabolism (4) *Kunze, Levy, Thummel* Advanced study of drug metabolism pharmacokinetics. Topics emphasize linear and nonlinear metabolic clearance kinetics, metabolite kinetics, in vitro-in vivo predictions, and drug-drug interaction kinetics. Prerequisite: PCEUT 506. Offered: odd years; A.

PCEUT 503 Drug Transport and Delivery (4) *Ho, Hu, Mao, Shen, Unadkat, Wang* Provides advance knowledge of the physico-chemical and biological concepts underlying in vivo transport and delivery of drugs. Prerequisite: PCEUT 506. Offered: odd years; Sp.

PCEUT 506 Pharmacokinetic Principles (2) *Thummel* Advanced study of pharmacokinetic concepts. Topics emphasize the physiological basis for mathematical models of drug distribution, clearance, and effect. Material

presented in a didactic format with additional interactive discussions. Offered: W.

PCEUT 508 Drug Discovery and Development (2) *Gardner, W. Nelson, Shen* Overview of steps that lead to the introduction of new pharmacologic agents for the treatment of disease. Included are the scientific underpinnings of drug discovery, preclinical evaluation, clinical trials, regulatory considerations, and outcomes research. Credit/no credit only. Prerequisite: Pharm D. student, graduate student, or permission of instructor.

PCEUT 510 Pharmacokinetics of Drug Interactions (3) *Levy, Shen, Thummel, Unadkat* Common pharmacokinetic mechanisms underlying the clinically important interactions between drugs. Interactions involving gastrointestinal absorption, serum drug protein binding, excretory and metabolic clearance processes are discussed. Prerequisite: PCEUT 405 or equivalent. Offered: A.

PCEUT 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and toxicogenomics. Emphasis placed on applications of genomic technologies to the understanding of "gene-environment interactions" that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H 513/PHG 513; A.

PCEUT 520 Seminar (1, max. 15) *Wang* Graduate students attend seminars and make one formal presentation per year while in residence; maximum of three presentations. Credit/no credit only. Offered: jointly with MEDCH 520; AWPpS.

PCEUT 534 Pharmaceutical Analysis (3) *Kalhorn* Methods of drug and metabolite analysis from biologic matrices. Emphasis on practical aspects of assay design, optimization, and validation. Approaches to troubleshooting both assay methodology and instrumentation problems are also covered. Credit/no credit only. Offered: W.

PCEUT 583 Topics in Pharmaceutics (1, max. 15) *Ho* Discussion of pertinent articles from current literature and recent laboratory results. Credit/no credit only. Offered: AWPpS.

PCEUT 584 Pharmacokinetic Discussion Group (2) Student initiated discussions of pharmaceutics concepts in relation to current literature. Preparatory to departmental cumulative examinations. Credit/no credit only. Offered: S.

PCEUT 586 Pharmaceutical Biotechnology (2/3, max. 3) *Ho, Hu, Thummel* Current topics in pharmaceuticals and biotechnology focusing on transforming small molecules, proteins, and genes into therapeutic products. Includes new drug therapies, drug design, pharmacogenomics, molecular modeling, high throughput screen, production and stability considerations, and delivery systems of protein and gene therapeutics in relation to pharmacokinetic and therapeutic responses. Offered: Sp.

PCEUT 590 Doctor of Pharmacy Thesis (1) Writing intensive course in which students develop a high quality scientific paper that

demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

PCEUT 598 Independent Research (*, max. 24)
Basic and clinical research problems in drug disposition and effect. Prerequisite: 2.5 GPA and permission of instructor. Offered: AWSpS.

PCEUT 599 Cumulative Exams for Pharmacists (1) Quarterly cumulative examinations for graduate students. Credit/no credit only. Offered: AWSpS.

PCEUT 600 Independent Study or Research (*) Credit/no credit only. Offered: AWSpS.

PCEUT 700 Master's Thesis (*) Credit/no credit only. Offered: AWSpS.

PCEUT 800 Doctoral Dissertation (*) Credit/no credit only. Offered: AWSpS.

Pharmacy

PHARM 301 Self-Care Products and Practices (2) *Dawson, Murphy* Addresses a broad range of health concerns including how to identify common conditions amenable to self-care, select appropriate treatment options ranging from non-prescription to non-drug therapies, prevent adverse effects from the use of medications, adopt strategies encouraging healthier lifestyle habits, and learn the rationale behind conventional and alternative/complementary therapies.

PHARM 304 Profession of Pharmacy (3) *Pelham* Overview of the profession of pharmacy emphasizing practice opportunities and specialization. Introduction to clinical and ethics case evaluation techniques using the Pharmacist's Workup of Drug Therapy format. Off-site pharmacy visitation required. Credit/no credit only. Prerequisite: PHARM 309.

PHARM 305 Introductory Pharmacy Practicum (3) *O'Sullivan* Preparation and dispensing of prescriptions at Rubenstein Memorial Pharmacy in Hall Health Center or other selected community pharmacies. Designed for Pharm.D. students with little or no experience in pharmacy. Under direct supervision of clinical faculty and other licensed pharmacy preceptors. Credit/no credit only.

PHARM 309 Quantitative Methods I (3) *O'Sullivan* Instruction in methods essential for conducting pharmacy calculations, interpreting and evaluating data and literature related to pharmacy, and responding to drug information inquiries from health professionals and patients. Introduction to statistical concepts necessary for pharmacy course work.

PHARM 334 Pharmacy Practice (3) *Hammer* Introduces students to principles of contemporary pharmacy practice and pharmaceutical care. Lecture topics include pharmacy practice issues and general knowledge of common medications. Laboratory activities include prescription processing and problem solving, patient education, sterile products preparation, physical assessment, and other patient care activities. Prerequisite: PHARM 309, PCEUT 331.

PHARM 335 Dispensing Practicum (4) *O'Sullivan* Under preceptor supervision, students master competencies necessary for distributional responsibilities in the institutional and ambulatory care pharmacy practice settings. Credit/no credit only.

PHARM 402 Drug Therapy and the Media (2)
Review of media to provide a perspective on disease and drug therapy. Elements include drug discovery and development, clinical trials, the pharmaceutical industry, regulatory agencies, and socioeconomic consideration. Preparation of written and oral summaries of media reports. Offered: jointly with PCEUT 402.

PHARM 403 Chemical Dependency Concepts (2) *Kedzierski* Genesis of addiction: harm reduction strategies, legal and ethical considerations, medication management in the substance-abusing population, impaired pharmacist rehabilitation, community resources. Course offered to Pharm.D. professional students. Credit/no credit only.

PHARM 405 The Nature of Scientific Truth (2) *Hansten* Drawing on the wisdom of scientists and philosophers, discussion of the nature and limitations of scientific truth, using examples from the practice of pharmacy whenever possible. Emphasizes reasoning errors that are common in science, particularly those that involve the application of scientific information to clinical practice. Credit/no credit only.

PHARM 408 Managed Care Pharmacy: Principles and Practice (3) *Fullerton, Penna* Surveys the activities, tactics, and strategies used by managed care to deliver pharmacy services to their members. Includes: formulary development, clinical improvement programs, quality improvement measures, regulatory activities, contracting with pharmaceutical manufacturers, network management, financial issues, sales and market, and provider relations. Open to 2nd-, 3rd-, and 4th-year Pharm D students.

PHARM 409 Applied Pharmacokinetics (2) *Anderson, Bauer* Pharmacokinetics of specific drugs. Influence of age, weight, sex, and disease states on patient-specific dosage regimens emphasized. Advanced kinetic concepts are discussed and put into applied context. Prerequisite: PCEUT 405.

PHARM 410 Pharmacy and Women's Health (2) *Anderson, Gardner* Participants gain an overview of the specific up-to-date knowledge of gender-based medicine; an understanding of the implications of gender-based biology and the opportunity to evaluate new research that has implications for the prevention and management of diseases and conditions in women. Credit/no credit only.

PHARM 411 Medical Devices for Home Health Care (3) *Downing*, Study of medical devices commonly provided by pharmacists to their patients, including their selection and adaptation for specific patient needs. Lectures include display and demonstration of actual devices.

PHARM 412 Nonprescription Drug Therapeutics (3) *Ellsworth* Overview of common classes of nonprescription drug therapeutics with an emphasis on case examples, patient assessment, non-drug adjunct therapy, product selection, and patient advice. Oral presentation required. Computer (internet) case discussion mandatory. Enrollment restricted to 2nd, 3rd, and 4th year Pharm.D. students.

PHARM 421 Foundations and Principles of Pharmacy Education (2) *Dawson, Hammer* Teaches principles of education that student educators and pharmacists can use in a multitude of educational environments. Focuses

on pharmacy education in general as well as instructional methods and teaching principles. Open to 2nd-4th-year PharmD students. Offered: A.

PHARM 431 Advanced Compounding Skills (1) *Hammer, Needham* Prepares the student to create unique, patient-specific pharmaceutical dosage forms used in contemporary pharmacy practice. Includes pre-readings and assignments, a didactic session and a laboratory session, and is offered over a weekend. Credit/no credit only. Prerequisite: PCEUT 331.

PHARM 436 Pharmacoeconomics, Genetics, and Healthcare (2) *Ramsey, Veenstra* Provides an introduction to outcomes research and economic evaluation related to pharmaceuticals and genetic technologies. Covers cost-effectiveness analysis and quality of life evaluation. Discusses the use of economic evaluation in healthcare to affect policy decisions.

PHARM 437 Chemical Dependency Issues in Practice (3) *Kedzierski* Emphasis on drug classes, pharmacologic management of abstinence and withdrawal, drug testing, drug use in pregnancy, treatment options and recovery, codependency and legal and ethical considerations. Credit/no credit only. Prerequisite: PHARM 403.

PHARM 438 Gerontological Communication Skills Seminar (2) *Dawson* Addresses special communication needs of the elderly, ranging from individualized patient counseling to patient advocacy through development and provision of pharmacy services. Communication techniques applicable to teaching, developing innovative services, supervising, motivating, conflict resolution, and interdisciplinary interactions are explored in lecture and laboratory. Credit/no credit only.

PHARM 439 Community Outreach Service (2) *Dawson* Work in assigned community services setting for a minimum of two hours per week to explore root causes of disability, cultural differences, professional values, community resources, and quality of life issues. Weekly seminars assist students in applying observations and experiences to pharmaceutical care.

PHARM 440 Human Behavior and Communication in Pharmacy (3) *Dawson* Focuses on how human behavior and communication influence the pharmacist's activities in designing, delivering, and managing patient-focused pharmaceutical care. Writing, listening, interviewing, teaching, and critical thinking as applied to pharmacy practice are emphasized.

PHARM 443 Pharmacy Teaching Practicum (2) *Dawson, Hammer* Allows students opportunity to apply learning about education in a mentored experiences. Students serve as assistant instructors in existing pharmacy courses or engage in other approved educational experiences. Prerequisite: PHARM 421. Offered: AWSpS.

PHARM 445 Pharmacy-Based Immunization Programs (1) *Hagel* Practical training in cholesterol, hypertension, bone density, and wellness assessment techniques, vaccine administration and management, and implementation of community-based public health programs. Following didactic and laboratory sessions students conduct screening and administer vaccines a community locations.

Offered following the first professional year.
Credit/no credit only. Prerequisite: MEDCH 401.

PHARM 447 Overview of Contraceptive Management (2) *Gardner* Didactic overview of contraceptive methods, fertility interventions, and medical abortions. Establishes forum for interactive discussion. Includes patient screening criteria and selection and monitoring outcomes of currently available barrier and hormonal methods of contraception and medical abortions. Open to all PharmD students, as well as other health science professional students.

PHARM 452 Contemporary Problems (1)
Discussion of current trends affecting the role of pharmacy in health-care delivery. Credit/no credit only.

PHARM 459 Pharmacy Ownership and Entrepreneurship (2) *Hammer* Discusses barriers to and benefits of independent pharmacy ownership. Describes the role, responsibilities and different management styles of the pharmacy owner. Evaluates differences with regard to purchasing an existing practice vs. starting a new practice. Explains legal considerations of ownership. Discusses how to create and the importance of a business plan. Offered: A.

PHARM 460 Principles of Professional Practice Management (2) *Downing* Emphasizes the major issues and barriers of providing pharmaceutical care in institutional and community pharmacies. Topics include evaluating workflow and facility design, complying with legal and safety standards, managing drug distribution services, payment for pharmacist services, human resource management and marketing pharmaceutical care services.

PHARM 463 Pharmacy Business Plan Development (1) *Downing, Gardner* Develops a business plan for purchasing an independent pharmacy. Prerequisite: PHARM 459. CR/NC only. Offered: WSp.

PHARM 468 Case Studies in Pharmaceutical Care (3, max. 9) *Dawson* Small groups of students work with an instructor to review cases illustrating various aspects of specific diseases: pathophysiology, clinical features, psychosocial factors, therapeutic interventions with emphasis on drug therapies, and community resources. Analytic reasoning, self-study skills, and knowledge are emphasized.

PHARM 478 Experiential Learning (1-6, max. 6) *O'Sullivan* Under faculty supervision, pharmacy students gain experience working on advanced practice projects, in a pharmacy practice setting, prior to the final year of the pharmacy program. Credit/no credit only. Prerequisite: satisfactory completion of the first quarter of pharmacy school.

PHARM 479 Quantitative Methods II (4) *Blough* Introduction to basic biostatistical concepts in the field of pharmacy. Prerequisite: PHARM 309.

PHARM 483 Institutional and Healthcare Systems Pharmacy Practice (2) *Somani* Presentation of topics regarding current contemporary institutions pharmacy practice. Discussion of new systems technology, home care programs, managed care, computer applications, budgeting, formulary systems, drug information services, intravenous admixture programs, quality assurance process, and patient oriented services.

PHARM 488 Elective Advanced Practicum (1-16, max. 40) *Plein* Advanced-level geriatric clinical pharmacy experience in institutional (hospital, nursing home, long-term-care facility) and ambulatory patient-care facilities under direct supervision of a clinical preceptor.

PHARM 490 Fluid and Electrolytes and Parenteral Nutrition (2) *Edwards* Principles of fluid and electrolyte therapy, including saline, water, and acid-base balance, carbohydrate, protein, lipid, vitamin, and mineral requirements in parenteral nutrition. Nutritional assessment, complications of parenteral nutrition, stability and compatibility of intravenous solutions, modifications of parenteral nutrition in pediatrics and specific disease states are also covered.

PHARM 491 Cancer Pharmacotherapeutics (2) *Kwok* Pharmacotherapy of cancer, covering supportive care (antibiotics, antiemetics, analgesics, nutrition) to the antineoplastic agents themselves. Specialists in each area serve as guest lecturers.

PHARM 492 Pharmaceutical Services for Long-Term Care (2) *Lam* Scope of pharmaceutical services for long-term care (LTC) and systems for services. Responsibilities of the pharmacist for distributive, administrative, and clinical pharmacy services for nursing homes and other long-term-care facilities. Economic considerations in provision of LTC pharmaceutical services, role of the consultant pharmacist for home-health-care organizations. Pharmaceutical services for independently living elderly.

PHARM 495 Special Studies in Pharmacy (*, max. 6) Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific areas. Students undertake independent study under the individual direction of a faculty member.

PHARM 497 Drug Therapy for the Elderly (3) *Gray, Christiansen* Clinical application of drug knowledge in the treatment of disease in older adults with multiple comorbidities. Application of age-related changes in pharmacokinetics and pharmacodynamics in the selection and monitoring of drug regimens of older adults. Emphasis on problem solving, using case examples. Prerequisite: nurse practitioner students or permission of instructor.

PHARM 499 Independent Study/Research (*, max. 6) Applied pharmaceutical research problems. Credit/no credit only.

PHARM 502 Neonatal Drug Therapy (3) *Blackburn* Clinical applications of drugs used with acute and chronically ill preterm and term neonates. Review of neonatal pharmacotherapeutics. Examination of selected therapeutic agents in relation to indications, efficacy, therapeutic and adverse effects, monitoring parameters, and dosing principles in the neonate.

PHARM 503 Critical Care Pharmacotherapeutics (2) *Rohrs* Introduction to the application of critical care pharmacotherapy topics to patient care. Covers: hemodynamic principles, vasoactive medications, sedation/analgesia, acute respiratory failure, ACLS, shock, fluid management, acute renal failure, severe infections, ACS/AMI. Prerequisite: 3rd-year PharmD student, or approval by instructor.

PHARM 504 Topics in Drug Safety (1) *Gardner, Hazlet* Introduces current policy issues in the

area of safety of marketed pharmaceutical products and medical devices. Examines contemporary controversies and drug safety problems being addressed by regulatory agencies, pharmaceutical and medical device industries, academicians, policy makers, researchers, health care providers, consumers, and consumer advocates.

PHARM 506 Seminar in Pharmacy Education I (1) *Murphy, Odegard* Discussion of scholarship and teaching in pharmacy education, focusing on the critical evaluation of educational research. Designed in a journal-club format, students participate in small group discussions and write an analysis paper. Prerequisite: PHARM 421 or permission of instructor. Credit/no credit only. Offered: W.

PHARM 507 Seminar in Pharmacy Education II (1) *Hammer, O'Sullivan* Students lead discussion about current issues in pharmacy and higher education as well as critically evaluate educational research. Weekly seminar includes small group discussions and journal-club methods.. Prerequisite: PHARM 506 or permission of instructor. Credit/no credit only. Offered: Sp.

PHARM 509 Medical Literature Evaluation (2) *O'Sullivan* Introduction to the processes involved in the assessment of primary and tertiary medical literature. Students are required to read and critique medical literature. Classes are conducted in a journal club format.

PHARM 510 Contemporary Concepts in Clinical Nutrition Support (1) *Chan* Addresses current topics and concepts in clinical nutrition support. Topics include assessment and management of patients requiring specialized nutrition support, enteral nutrition, and parental nutrition. Prerequisite: biochemistry, anatomy and physiology, or permission of instructor. Offered: A.

PHARM 511 Current Topics in Immunology and Immunotherapeutics (2) *Hebert* Overview of the immune system and pharmacologic agents which modulate the immune response. Credit/no credit only. Prerequisite: second-, third-, or fourth-year Pharm.D. student or permission of instructor.

PHARM 512 Clinical Applications of Drug Interactions (2) *Horn* Discussion of the clinical evaluation and management of drug-drug interactions using patient situations. Focus on patient- and drug-related factors that predispose patients to adverse drug interactions, as well as clinical management of patients found to be at risk. Credit/no credit only. Prerequisite: third- or fourth-year Pharm.D. student.

PHARM 514 Primary Care Pharmacotherapeutics (3-4, max. 4) *Kirkness* Explores clinical applications and therapeutic issues for selected drug categories commonly used in primary care settings and across age groups. Selected drug categories defined by pharmacokinetics, indications for use, efficacy, therapeutic and adverse effects, monitoring parameters, dosing principles, common drug interactions. Patient education, socioeconomic, and behavioral factors emphasized.

PHARM 515 Pharmacotherapeutics for Acute/Critical Illness (3) *Landis* Analysis of issues that impact the assessment, prescription, and evaluation of pharmacotherapeutic regimens for patients who are acutely or critically ill. Current

research, clinical contextual considerations, and pharmacotherapeutic principles are emphasized as the basis for decisions relevant to the management of pharmacotherapy in acute care clinical practice.

PHARM 516 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing, and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 517 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing, and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 518 Certificate Program in Biomedical Regulatory Affairs (3) *Hazlet* Comprehensive overview of the knowledge and skills necessary to be an effective regulatory affairs and compliance specialist overseeing the design, development, testing, and production of drugs, biotechnology-derived therapeutics, and medical devices. Credit/no credit only.

PHARM 519 Pharmacotherapeutics for Infectious Disease and Infection (2) *Black* Analysis of pharmacotherapeutics to control infection and manage infectious disease through seminar discussion of cases, critical analysis of a pharmacotherapeutic regimen, and development of references to enhance students' clinical expertise. Emphasis on principles of anti-infective therapy, problem solving clinical cases with complex medication regimens, and identifying judicious pharmacotherapeutic plans.

PHARM 522 Current Topics in Acute Care Pharmacotherapy (1) Increase understanding and stimulate discussion in the current topics related to acute care pharmacotherapy. Students have opportunities to review the management of patients in the acute care setting through current cases presented by the instructors. Emphasizes interactive learning. May be taken alone or concurrently with PHARM 503.

PHARM 523 Survey of Biomedical Regulatory Affairs (3) *Hazlet* Overview of the knowledge, terminology, and skills necessary to be an effective regulatory affairs or compliance specialist in the design, development, testing and production of drugs, biotechnology-derived therapeutics, and medical devices. A class project is required. Offered: even years.

PHARM 532 Methods in Pharmaceutical Policy Analysis (4) *Hazlet*, Introduction to the tools used in and the framework and dominant contexts for pharmaceuticals policy development and analysis. Methods reviewed in a series of sessions presenting a specific method and case analyses involving pharmaceuticals development. Project and in-class presentation required. Prerequisite: graduate standing in pharmacy or permission of instructor.

PHARM 533 Pharmacoeconomics (3) *Gardner, Heckbert* Overview of pharmacoeconomics including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction

to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: Graduate student or with permission. Offered: jointly with EPI 533.

PHARM 534 Economic Evaluation in Health and Medicine (3) *Patrick, Sullivan* Methods and techniques for evaluating costs and cost-effectiveness of health, medical, and pharmaceutical interventions. Emphasis on economic evaluation, decision analysis, and modeling techniques for resource allocation and decision making. Applications to technology assessment, health policy, clinical practice, and resource allocation. Prerequisite: permission of instructor. Offered: jointly with HSERV 583.

PHARM 535 Evaluating Cost and Outcomes in Health and Medicine 2 (3) *Patrick, Sullivan* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis, pharmacoeconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with HSERV 584.

PHARM 536 Principles of Publishing Clinical Evidence (2) *Cummings, Johnson, Olson* Explains advanced methodologic principles for improving the clarity of published clinical evidence. Students prepare and revise a 1000-word research letter for *The Lancet* using their own clinical evidence. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with EPI 534.

PHARM 541 Health Care and Society (3) Introduction to health services and pharmacy practice designed for future health-care practitioners. Examines the history, organization, and effectiveness of the U.S. health-care system. Stresses the student's ability to adopt a broad perspective across health-care disciplines and traditional boundaries.

PHARM 543 Pharmacy Laws and Ethics (4) *Hazlet* Study of the laws regulating the practice of pharmacy. Professional liability, warranties, and contracts are discussed. Case studies of ethical considerations of pharmacy practice.

PHARM 544 Survey of Pharmacy Laws (1) *Hazlet* Prepare, discuss, present responses to assigned questions developed by faculty regarding laws governing pharmacy practice in the course of reviewing for the Multistate Pharmacy Jurisprudence Examination. Class meets for two consecutive Saturdays in March. E-mail and web-access required. Non-matriculated students by permission only. Credit / no credit only.

PHARM 549 Pharmacotherapeutics for Older Adults (3) *Gray* Clinical application of drug knowledge in the treatment of disease in older adults with multiple comorbidities. Application of age-related changes in pharmacokinetics and pharmacodynamics in the selection and monitoring of drug regimens of older adults. Emphasis on problem solving, using case examples. Prerequisite: PHARM 560; PHARM 561 or permission of instructor.

PHARM 550 Current Topics in Geriatric Pharmacotherapy (1) *Gray* Review primary medical literature to discuss contemporary issues related to geriatric pharmacotherapy. Credit/no credit only. Prerequisite: PHARM 509 or permission of instructor.

PHARM 560 Therapeutics I (10) *Black, McCune* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 561 Therapeutics II (9) *Bauer, Horn* Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 562 Therapeutics III (9) Clinical application of drug knowledge in the treatment of disease. Emphasis on problem-solving, using case examples.

PHARM 568 Healthcare of Cancer Survivors (2) *Barry, McCune* Focuses on teaching the health science students about cancer survivorship issues. Discusses the health concerns of those who have been cured of their initial malignancy but are still at risk of long-term effects of chemotherapy, radiation, and surgery. Prerequisite: PHARM 560. Offered: jointly NURS 533; odd years, Sp.

PHARM 573 Laboratory and Functional Assessment: Geriatrics (1) *Lam* Application of laboratory data and functional assessment in planning care for older adults. Case study/ seminar format in which students recommend appropriate tests, interpret test results, and gain experience in performing tests of function. Recommended: MEDCH 435 or permission of instructor. .

PHARM 574 Clinical Introductory Practicum (1) *O'Sullivan* Students spend three days in a patient care setting, under the guidance of preceptors or advanced students, as an introduction to the practicum experience. Credit/ no credit only.

PHARM 575 Institutional Clinical Practicum (5, max. 15) *O'Sullivan* Under faculty supervision, fourth-year students provide pharmaceutical care in an inpatient environment. Credit/no credit only.

PHARM 576 Ambulatory Care Clinical Practicum (5, max. 15) *O'Sullivan* Under faculty supervision, fourth-year students provide pharmaceutical care in an outpatient environment. Credit/no credit only.

PHARM 577 Advanced Practicum (5, max. 40) *O'Sullivan* Under faculty supervision, fourth-year students gain experience in practice settings of their choice. Credit/no credit only.

PHARM 578 Advanced Elective Practicum (1-10, max. 20) *O'Sullivan* Faculty-supervised practica either in areas of traditional practice or in innovative practice plans designed by faculty and student. Objectives, activities, schedules, and lengths are site- and preceptor- specific. Credit/no credit only.

PHARM 579 Senior Care Practicum (1-6, max. 12) Under faculty supervision, fourth-year pharmacy students gain experience working with drug therapy regimens in the elderly. Prerequisite: acceptance to the pharmacy school's Geriatric Certificate program. Offered: AWSpS.

PHARM 586 Clinical Case Conference (2) *Bauer, Horn* Weekly pharmacotherapy case conference emphasizing current therapeutics and clinical decision making. Credit/no credit only.

PHARM 590 Doctor of Pharmacy Thesis (1)

Writing intensive course in which students develop a high quality scientific paper that demonstrates grammatical and organizational excellence and the ability to critically evaluate biomedical literature. Credit/no credit only.

PHARM 595 Special Studies in Pharmacy (1-6, max. 24)

Special studies of professional topics in pharmacy. An opportunity to expand the breadth and depth of understanding in specific pharmaceutical areas. Students may undertake independent study under the individual direction of a faculty member. Credit/no credit only.

PHARM 596 Seminars in Pediatric Pharmacotherapy (2) Weber, Sawyer

Overview of drug

disposition and medication utilization as it applies to the pediatric patient. Specific emphasis on neonatology and ambulatory pediatrics. Credit/no credit only. Prerequisite: third-year Pharm.D. student or permission of instructor.

PHARM 597 Graduate Seminar (1) Blough,

Gardner, Hazlet, Sullivan, Veenstra Interactive discussion of topical issues, methods, or analytic techniques. Topics vary. Credit/no credit only. Prerequisite: graduate program student.

PHARM 598 Case Conference: Geriatrics (1)

Plein Students taking geriatric pharmacy clerkships in various clinical settings meet with faculty to present case studies of elderly patients

requiring complex drug therapies. Credit/no credit only. Prerequisite: Pharm.D. fourth-year practicum in geriatrics or general medicine.

PHARM 599 Independent Study/Research (1-6, max. 24)

Applied pharmaceutical research problems. Credit/no credit only.

PHARM 600 Independent Study or Research (*)

Credit/no credit only.

PHARM 700 Master's Thesis (*)

Credit/no credit only.

PHARM 800 Doctoral Dissertation (*)

Credit/no credit only.

Evans School of Public Affairs

Public Affairs

PB AF 499 Topics in Public Policy (3-5, max. 6)

I&S Examines selected issues of importance in all areas of public policy. Focus on in-depth analysis of vital public policy issues and the integration of economic, political, and administrative perspectives on them. Offered: jointly with POL S 404.

PB AF 500 General Seminar (1, max. 9)

PB AF 501 Legislative Relations (3) Studies role of legislative bodies in American public policy making. Builds on case studies and focuses on tactics, constraints, and options involved in working within a legislative process to achieve public policy goals.

PB AF 502 Political Management of Policy Process (3) Analyzes the issues which public managers address when they seek to make and implement public policy and programs. Pays particular attention to the institutional and political constraints on policy making and the skills needed to address them.

PB AF 503 Administrative and Executive Leadership (3) Nature of executive life in the public sector, the function of leadership in implementing, making, and changing policy. Leadership styles, the relation of leadership to its constituencies and communities.

PB AF 504 Leadership Ethics (3) Addresses the moral challenges facing leaders in the public and nonprofit sectors. Examines the values and virtues important to sustained ethical leadership as well as strategies to build strong institutional cultures and support ethical practices in institutions.

PB AF 505 The Law of Public Administration (3)

Legal framework of public administrative action in the United States, emphasizing constitutional requirements; operation of the administrative process; management of personnel, funds, and contracts; and judicial review of administrative activity.

PB AF 506 Ethics and Public Policy (3)

Teaches students to identify moral issues in public life. Special focus on the integration of moral concerns into public discussion in a manner which contributes to good policy and does not polarize issues. Discusses moral and political theory by focusing on contemporary cases and issues.

PB AF 507 Mediation and Negotiation as Instruments of Public Management and Policy-Making (3)

Possibilities offered by mediation and negotiation methods using a mixture of cases, readings, discussions, lectures, and guest speakers. Use of negotiation and mediation techniques to resolve disputes and disagreements over public-policy issues.

PB AF 508 Management Approaches to Service Delivery (3)

Examines how services can be delivered in a way that is responsive to the needs of those being served and maximizes the effective utilization of resources. Topics addressed include: needs assessment, process analysis, service strategy, sustaining the service organization, case management, and services integration.

PB AF 509 Managing People in Public and Nonprofit Agencies (3)

Emphasizes the role of the program manager rather than that of the personnel officer. Managing people within a variety of programmatic, bureaucratic, and political settings. Case studies form basis of class discussion, assignments.

PB AF 510 Foundations of Public Service in American Democracy (1)

Discusses the role of public service in the United States through examination of historical and institutional foundations of the U.S. political regime. Pays special attention to the structures of government and constitutional values and conflicts at the heart of the political system. Offered: A.

PB AF 513 Public Policy Analysis (3)

Production and use of analysis to support public policy decisions. Defining problems, devising alternative solutions, clarifying stakes in choices, predicting impacts of choices. Skills developed by working on specific policy problems. Assumes familiarity with statistics, microeconomic theory, and institutions and processes of American government. Prerequisite: PB AF 516 or permission of instructor. Offered: a.

PB AF 515 Decision Making for Public Managers (3)

Considers decision making from normative, prescriptive, and descriptive perspectives. Emphasizes individual decision making, with some discussion of organizational decision practice. Focuses on decision analysis; presents tools for structuring decisions; and considers the role of analysis as a basis for negotiation.

PB AF 516 Microeconomic Policy Analysis (3)

Ways in which microeconomic analysis can contribute to the analysis of public sector issues. Supply and demand, consumer and firm

behavior, competitive and monopoly markets, income distribution, market failure, government intervention. Policy applications of theory. Prerequisite: elementary economics. Offered: A.

PB AF 517 Economics of the Public Sector (3)

Methods of analyzing effects of public expenditures and taxes on behavior of individuals and firms, on economic efficiency, and on equity and distribution of income. Theory and practice of intergovernmental fiscal relations. Application of theory to formulation of public policy. Prerequisite: PB AF 516.

PB AF 519 Law and Economics (4)

Offered: jointly with LAW A 561.

PB AF 520 Intergovernmental Relations (3)

Comparative study of the issues involved in implementing government programs across multiple jurisdictions. Issues of accountability, feasibility, politics, and constitutional limits are examined by focusing upon various methods used to implement programs across federal, state, regional, and international jurisdictions.

PB AF 522 Public Budgeting and Financial Management (3)

Budgeting as a management process. Study of formulation and administration of government budgets, including role of budgeting in policy processes, approaches to budget formulation and analysis, development of the PPB approach, and aspects of budget administration, such as revenue estimating, allotment control, cost accounting. Prerequisite: PB AF 516 or permission of instructor. Offered: W.

PB AF 523 Financial Management in the Public Sector (3)

Exploration of the managerial uses of accounting and other processes of financial management in the public sector. Topics covered include: financial planning and control, fund accounting, cost accounting, asset accounting, internal controls, auditing, financial analysis, and financial reporting. Prerequisite: permission of instructor.

PB AF 526 Program Evaluation (3)

Theory, practice, and politics of evaluation, from simple feedback mechanisms to evaluation of large-scale ongoing programs and social experiments. Emphasis on applications of experimental and quasi-experimental evaluation. Case studies illustrate various types of evaluation. Prerequisite: background in quantitative methods.

PB AF 527 Quantitative Analysis I (3)

Two-quarter sequence explores how to formulate research questions, gain experience with conducting research, and learn how to assess

which statistical tools or research methods are appropriate to answer different types of policy or management questions. Covers probability, descriptive statistics, hypothesis testing, and confidence intervals. Prerequisite: graduate status in School of Public Affairs or permission of instructor. Offered: W.

PB AF 528 Quantitative Analysis II (3) Second quarter of a two-quarter sequence aimed at helping students become informed users and critical consumers of research and statistical analysis. Combines material on research design and data collection methods with tools for multivariate analysis. The multivariate analysis methods include correlation and an introduction to multivariate regression. Prerequisite: PB AF 527. Offered: Sp.

PB AF 529 Advanced Multivariate Analysis (3) *Klawitter* Prepares students for advanced work with multivariate methods in program evaluation and policy analysis. Includes a data project what results in a professional quality product; reading examples of professional work and presentations of methods and results Offered: A.

PB AF 530 International Affairs (3) Provides a broad understanding of international issues and United States policy. Students explore U.S. foreign policy and theories of major international actors in international trade, security, and strategic concerns, refugee policy, conflict resolution, development assistance, and the environment. Offered: jointly with POL S/SIS 534.

PB AF 531 Development Management in the 21st Century (3) Addresses organization, administration and evaluation in governmental and non-governmental agencies involved in development efforts. Students examine development strategies, alternative management approaches, and management skills such as budgeting, finance, human resource development and program evaluation. Other topics include communication, expatriate/local power imbalances, decentralization, community involvement, culture, and personnel issues.

PB AF 532 Managing Policy in a Global Context (3) Examines different policy environments leaders must address to achieve policy in comparative and international settings. Includes strategies, tactics, and frameworks needed to initiate and sustain policy dealing with authoritarian, democratic, liberal, and one-party states. Focuses on pressures from the international system and issues such as globalization.

PB AF 533 Economics of International Development (3) Introduction to sustainable international development and its physical, human, social, and natural capital components. Students examine the new growth theories and evidence, and their relationship to democracy, trade, and other policies and institutions. Topics include income distribution, poverty, and the environment.

PB AF 534 Rural Development: Economics and Policy (3) *Fletschner* Survey of current microeconomic questions related to well-being of rural people in developing countries. Strengthens the ability to design appropriate policy tools for rural development by enhancing understanding of economic theory and its applications to rural households and by reviewing findings. Offered: W.

PB AF 536 Program Evaluation in the Developing World (3) *Gugerty* Provides an overview of issues in the analysis and evaluation

of development projects focusing on the developing world with three themes: understanding and analyzing development programs, understanding and using the logic of impact assessment; identifying practical, field-based tools for monitoring and evaluation in low resource environments. Offered: Sp.

PB AF 537 Topics in International Affairs (3, max. 12) Examines topics of interest and import in foreign policy and international affairs. Focuses on the in-depth analysis of issues and the integration of economic, institutional, and political dimensions.

PB AF 538 International Organizations and Ocean Management (3) Survey of the manner in which international regimes and organizations attempt to manage and regulate the uses of the ocean. Primary emphasis is on the analysis of the effectiveness of regimes and of processes that support or constrain these organizations. Prerequisite: SMA 500 or permission of instructor. Offered: jointly with SMA 507.

PB AF 539 Values in International Development (3) *Fletschner* Examines and clarifies international development values, including underlying theories of justice on which they seem to be built, the ways in which they are justified to stakeholders, the general public, and impacts they have upon people, especially the poorest and most vulnerable. Offered: W.

PB AF 540 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Offered: A.

PB AF 541 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: PB AF 540. Offered: W.

PB AF 542 Integrated Public Management Sequence (3) Analyzes the institutional and political context of modern public management. Cases, readings, and discussion provide an integrated introduction to the major skills needed to successfully lead and manage government and nonprofit organizations. Prerequisite: 541. Offered: Sp.

PB AF 543 Public Leadership Seminar (3) Focus on the societal context of managerial life. Credit/no credit only. Prerequisite: permission of instructor. Prerequisite: graduate standing in Public Affairs Evening Degree Program. Offered: A.

PB AF 544 Public Leadership Seminar (1-3, max. 3) Integrated use of analytic and management concepts in the making of policy. Prerequisite: PB AF 543. Offered: W.

PB AF 545 Public Leadership Seminars (3) Provides a forum to reflect on the major dimensions of modern managerial leadership at the end of the program. Includes a team project working with outside clients or organizations. Prerequisite: PB AF 544.

PB AF 550 Management of Not-for-Profit Organizations (3) Focuses upon the roles

played by not-for-profit organizations in meeting the public good. Examines internal management issues such as structure, budget, and operations; and external issues such as board functions, legal status, marketing, media relations, and fund-raising.

PB AF 551 Public Management: Program Planning and Design (3) Policy context of planning and programming, the institutionalization of purpose, the planning process, activity design, work scheduling and measurement, and program evaluation.

PB AF 552 Public Arts Policy and Management (3) Role of government in arts. Range of public support at federal, state, and local levels; reasons for its development and viability. Nature, evolution, functions of public arts agencies in implementing arts policy; relation of such agencies to their constituencies. Seattle, King County, and Washington State serve as case studies.

PB AF 553 Financial Management in the Non-profit Sector (3) *Breitner* Provides an understanding of the financial framework of nonprofit organizations. Focuses on the financial principles of management of nonprofits, with an emphasis on financial reporting, strategic financial planning, managerial decision-making and budgeting. Offered: A.

PB AF 554 Nonprofit Organizations and Public Policy (3) Examines the changing role of nonprofit organizations in American society. Selected policy topics include privatization, for-profit/nonprofit competition, public-private partnerships, tax policy, and new sources of revenues.

PB AF 555 Topics in Nonprofit Management (3, max. 12) Examines various topics of public importance in nonprofit management. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 560 Urban Affairs (3) Explores national/local urban policy concerning the major problems confronting cities and metropolitan regions today. Economic globalization, income inequality, and metropolitan decentralization shape the urban agenda, the context for urban policy, and the analytic focus of the course. A project allows the exploration of strategies for intervention. Offered: jointly with URBDP 560.

PB AF 561 Urban Economics and Public Policy (3) Examines the rationale for and consequences of public intervention in urban land, housing, and transportation markets through land use regulations such as zoning and urban growth boundaries, infrastructure investments, and fiscal policies to manage urban development and traffic. Prerequisite: PB AF 516 or equivalent. Offered: jointly with URBDP 561.

PB AF 562 Introduction to Neighborhood Planning and Community Development (3) Provides introduction to basic practices in neighborhood planning and community development, including theoretical/historical bases; developing neighborhood plans/projects; indicators and evaluation of neighborhood quality; community participation; institutional framework, ethical dilemmas, and professional roles. Addresses current issues, including Seattle's experience, NIMBYism, security, neighborhood character, housing segregation, environmental racism. Offered: jointly with URBDP 562.

PB AF 563 Seminar in Urban Planning and Policy (1) Seminar for students in the MPA/MUP concurrent degree program. Explores topics that intersect urban planning and policy, through exchange with faculty and professionals working in this arena. Focuses on developing thesis topics that explore this intersection. Offered: jointly with URBDP 563.

PB AF 565 Topics in Urban Affairs (3, max. 12) Examines various topics of public importance in urban policy. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 569 Race and Public Policy (3) Analyzes the way in which the persistent problem of race is expressed in the formation and implementation of social and public policy.

PB AF 570 Social Policy Analysis and Management (3) Examines major institutions and programs in the human resources policy area: education, regulation of labor market, health care, income maintenance, social services. Discusses alternative policy instruments, analytic perspectives, intergovernmental issues, and management issues arising across policy areas. Explores challenges of linking services and clients across separate agencies.

PB AF 571 Education, The Workforce, and Public Policy (3, max. 6) Examination of policy issues involving education, training, the economy, and the development of the nation's human resources. Relationship between education, training, and work, underutilized workers, race and gender discrimination issues, and the role of education and training in economic development. Offered: jointly with EDLPS 563.

PB AF 573 Topics in Education and Social Policy (3, max. 12) Examines various issues of public importance in the areas of education and social policy. Focuses on in-depth analysis of relevant issues and the integration of the economic, administrative, and political dimensions of these issues.

PB AF 575 Public Policy Processes (5) Political science frameworks, approaches, and theories concerning development and implementation of public policies within American political systems. Governmental behaviors and processes, including rational, political, and bureaucratic models of governmental decision making; agenda-building processes; and normative perspectives concerning role of governmental entities.

PB AF 581 Information Technology and the Policy-Making Process (3) Demystifies information base for policy making in democracies. Examines theoretical and practical issues associated with information processing in the public sector. Considers role of new technologies in collecting, analyzing, and disseminating information with special attention to the relationship between these technologies and effective government service, public participation, and organizational accountability.

PB AF 582 News Media and Public Policy (3) Explores impacts of news coverage on public policy. Exposure to journalists' approaches to coverage of public affairs, as well as to strategies used by leaders of public/non-profit agencies to attract favorable coverage and minimize damaging coverage. Students learn techniques for assessing impacts of news coverage.

PB AF 585 Topics in Science, Technology, and Public Policy (3) Examines relationship between advancement of technical knowledge and pace of technological change, and public policies to induce or respond to these trends. Generic issues of government research, development, and personnel training programs are addressed. Applications of policy issues involving biomedical, communications, energy, environmental, transportation, and weapons technologies.

PB AF 586 International Science and Technology Policy (3) Seminar is designed: first, to analyze the relationships between research and development policy, capabilities, and national technological strategies for advanced industrial and less-developed countries; second, to deal with the international implications of particular technologies as countries try to make policy for them in regional and global organizations. Examples of specific technologies are chosen from such fields as space telecommunication, weather and climate modification, airline transportation, nuclear energy, and seabed exploitation.

PB AF 589 Risk Assessment for Environmental Health Hazards (3/4) Context, methodologies, types of data, uncertainties and institutional arrangements for risk assessment. Both qualitative and quantitative approaches to the identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Offered: jointly with CEE 560/ENV H 577.

PB AF 590 Environmental Policy Processes (3) Presents background to establish the need for environmental policy. Explores in a comparative manner, examining both successes and failures, various strategies that have been used or proposed to protect the environment. Offered: jointly with CFR 592.

PB AF 591 Seminar in Resource Policy and Management (1) Introduction and orientation for concurrent degree program between the Evans School of Public Affairs and the College of Forest Resources. Examines research and literature on contemporary issues related to the integration of natural resource science, policy, and management, through discussion among faculty, students, and invited speakers. Offered: jointly with CFR 591.

PB AF 592 Resource Policy and Administration (5) Study based on understanding of the actors, arenas, issues, and policy communities that form the context for policy development and implementation. Exploration of approaches to policy inquiry. Consideration of implications for both policy and management. Students develop a study design for course project. Offered: jointly with CFR 571.

PB AF 593 United States Energy Policy (3) Energy policy formulation and implementation with emphasis on post-1973 developments. Energy conservation programs; changing roles of oil, coal, gas, nuclear, and solar energy; institutional, environmental and equity considerations; government research and development programs.

PB AF 594 Economic Approaches to Environmental Management (3) *Layton* Examines the economic tools relevant to natural resource and environmental management. Tools are developed in the context of a series of resource problems, with an eye towards building intuition useful for addressing complex policy

problems that do not fit neatly into textbook examples. Offered: W.

PB AF 595 Topics in Environmental Policy and Management (1-3, max. 12) Examines various topics of public importance in environmental policy and management. Integrates the political, managerial, and economic dimensions of these issues.

PB AF 596 Ethics and Values in Environmental and Natural Resource Policy (3) *Zerbe* Explores environmental values and ethics and their relationship to the policy process. Includes content on value foundation of economic efficiency and its relationship to fairness, legal entitlements, duty to other creatures, and incommensurabilities in valuing goods. Current policy controversies are addressed.

PB AF 597 Role of Scientific Information in Environmental Decisions (3) *Cullen, Snover* Examines how science contributes to decisions that involve the natural environment; how science and scientists help frame debates and decisions; how scientific findings are incorporated into decision-making processes; how scientists and non-scientists deal with uncertainty about scientific questions. Offered: Sp.

PB AF 598 Administrative and Policy Skills Workshop (1-3, max. 3) Teaches practical administrative, leadership, and analytic skills commonly required of managers and analysts in the public and non-profit sectors. The workshops emphasize hands-on problem resolution, simulations, and actual practice.

PB AF 599 Special Topics (1-6, max. 6) Study and analysis of special topics in public affairs. Topics vary each quarter depending on curricular needs and interests of students and faculty. Prerequisite: permission of instructor.

PB AF 600 Independent Study or Research (*)

PB AF 605 Degree Project ([1-6]-, max. 6) .

PB AF 606 Public Service Clinic (3-) *Carlson, Madison, Page* Serves to meet the degree project requirement as part of the Evans School curriculum. Students work in a supportive environment facilitated by peer and faculty to connect the research, organizational change, and capacity-building needs of community organizations and public agencies.

PB AF 607 Public Service Clinic (-3) *Carlson, Madison, Page* Serves to meet the degree project requirement as part of the Evans School curriculum. Students work in a supportive environment facilitated by peer and faculty to connect the research, organizational change, and capacity-building needs of community organizations and public agencies.

Public Affairs Executive MPA

PA EX 501 Strategic Leadership (5) Executive MPA foundation course. Introduces key concepts required to lead effectively in the public and nonprofit sectors, including: the authorizing environment, leadership, organizational cultures, strategic decision-making, the use of data in evaluation, strategic and operational planning, and placing the modern organization in regional and global economic context. Workshop participation.

PA EX 502 Partnership and Accountability (3)
Deepens the understanding of collaboration and partnerships in the public and non-profits sectors, including the importance of customer service, the value of teams, developing and managing a functional team, and creating accountability in frameworks for intergovernmental relations and governmental partnerships.

PA EX 503 Negotiation and Conflict Resolution (3)
Theory and practice of negotiation in two-party, multi-party, and multi-issue situations. Structural analysis, interest identification, positions, power and dependence, resolving disputes, finding mutual gains, perceptions of conflict and methods of resolution. Focuses on techniques and nuances of negotiation most useful to a manager working in a complex public service environment.

PA EX 504 Effective Communication (3)
Theory and practice of effective communication, including speech, memoranda, and working with broadcast media. Philosophy and ethics of persuasion in public and non-profit sectors,

psychology of compliance, advocacy and motivational facets of leadership. Continuation of power and dependence, perceptions of conflict and mutual gains from previous modules. Intensive workshop participation.

PA EX 505 Leading with Integrity (3) *Campbell, Macaluso*
Moral and ethical dimensions of leadership. Understanding diversity and developing multi-cultural competence and self-awareness. Expanding leadership capacity in others, including employees. Developing judgment and emotional intelligence, defining and earning public trust, and understanding complexity of leadership in the public sector. Continuation of leadership development, exercises, and assessments.

PA EX 506 The Performance Challenge (5) *Benson, Breitner, Klawitter*
Performance management, including performance measurement, as a framework for defining and achieving value in public and nonprofit organizations. Development and evaluation of policy alternatives. Use and interpretation of data for both

managerial decision making and policy agenda-setting, including decision analysis and interpretation of research results.

PA EX 507 Strategic Financial Management I (3) *GE Breitner, Smith*
Introduction to state and local public finance and nonprofit financial management and analysis. Political context and economic forces causing fundamental shift in sources of revenue and types of financing for public service. Fundamental concepts of financial statements, their nature and use in the public and nonprofit sectors.

PA EX 508 Strategic Financial Management II (3) *Breitner, Smith*
Second of two modules focusing on strategic financial management. Alternative forms of organizational financial structure. Analytic skills and managerial applications of financial accounting and budgeting, techniques of financial analysis, performance budgeting, debt management. Strategic finance linked to contracting, multiple forms of privatization, social enterprise, and managing multiple revenue streams.

School of Public Health and Community Medicine

Biostatistics

BIOST 111 Lectures in Applied Statistics (1)
NW Weekly lectures illustrating the importance of statisticians in a variety of fields, including medicine and the biological, physical, and social sciences. Contact instructor for information on which fields of applications emphasized. Credit/no credit only. Offered: jointly with STAT 111; Sp.

BIOST 290 Introduction to Biomedical Research: Study Design and Interpretation (3)
NW Biostatistical concepts necessary for the interpretation, evaluation, and communication of biomedical research are introduced. Course topics include biomedical study design, randomization, graphical data displays, control of bias, variability, confounding, interaction, and ethics of human experimentation. Students participate in group and individual projects, group discussions, and oral presentations.

BIOST 499 Undergraduate Research (*)
Supervised reading programs; library and field research; special projects. Credit/no credit only.

BIOST 502 Introduction to Statistics in Health Sciences (4)
Description and examples of common concepts in biostatistics. Probability, point and confidence interval estimation, hypothesis testing including two-sample and paired t and chi-square tests, introduction to simple linear regression. Examples in health sciences stressed. Offered: S.

BIOST 503 Application of Statistics to Health Sciences (4)
Standard statistical techniques presented with examples drawn from the health sciences literature. Critical interpretation of research results, and introduction to the computer for data processing and statistical analysis. Prerequisite: BIOST 502 or equivalent. Offered: S.

BIOST 509 Special Emphases in Biostatistics (3-5, max. 5)
Introduction to concepts and methods of descriptive and inferential statistics, with applications in specific disciplines emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, nonparametric methods,

linear regression and correlation. Different sections target specific student populations.

BIOST 510 Biostatistics in Dentistry (3)
Introduction to concepts and methods of descriptive and inferential statistics with applications in dentistry emphasized. Topics include comparison of means and proportions, hypothesis testing, confidence intervals, non-parametric methods, linear regression, and correlation. Prerequisite: enrollment in School of Dentistry or permission of instructor. Offered: jointly with DPHS 568.

BIOST 511 Medical Biometry I (4)
Presentation of the principles and methods of data description and elementary parametric and nonparametric statistical analysis. Examples are drawn from the biomedical literature, and real data sets are analyzed by the students after a brief introduction to the use of standard statistical computer packages. Statistical techniques covered include description of samples, comparison of two sample means and proportions, simple linear regression and correlation. Offered: AS.

BIOST 512 Medical Biometry II (4)
Multiple regression, analysis of covariance, and an introduction to one-way and two-way analyses of variance: including assumptions, transformations, outlier detection, dummy variables, and variable selection procedures. Examples drawn from the biomedical literature with computer assignments using standard statistical computer packages. Prerequisite: either BIOST 511 or BIOST 517, or equivalent. Offered: W.

BIOST 513 Medical Biometry III (4)
Analysis of categorical data including two sample methods, sets of 2 x 2 tables, R x C tables, and logistic regression. Classification and discrimination techniques. Survival analysis including product limit estimates and the Cox proportional hazards model. Prerequisite: BIOST 512 or permission of instructor. Offered: Sp.

BIOST 514 Biostatistics I (4)
Mathematically sophisticated presentation of principles and methods of data description; graphics; point, confidence interval estimation; hypothesis testing; relative risk; odds ratio; Mantel-Haenszel; chi-square test (matrix algebra required).

Examples drawn from biomedical literature; real-data sets analyzed using statistical computer packages. Prerequisite: biostatistics majors or permission of instructor. Offered: A.

BIOST 515 Biostatistics II (4)
Mathematically sophisticated introduction to linear models; multiple regression, correlation; residual analysis; dummy variables; analysis of covariance; one-, two-way analysis of variance; randomized blocks; fixed, random effects (repeated measure, factorial designs); multiple comparisons (matrix algebra required). Real biomedical data sets analyzed. Prerequisite: BIOST 514, biostatistics major, or permission of instructor. Offered: W.

BIOST 516 Statistical Methods in Genetic Epidemiology (3)
Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BIOST 513 or BIOST 518; PHG 511/EPI 517, or permission of instructor. Offered: jointly with EPI 516/PHG 519.

BIOST 517 Applied Biostatistics I (4)
Introduction to the analysis of biomedical data. Descriptive and inferential statistical analysis for discrete, continuous, and right censored random variables. Analytic methods based on elementary parametric and non-parametric models for one sample; two sample (independent and paired), stratified sample, and simple regression problems. Offered: A.

BIOST 518 Applied Biostatistics II (4)
Multiple regression for continuous, discrete, and right censored response variables, including dummy variables, transformations, and interactions. Introduction to regression with correlated outcome data. Model and case diagnostics. Computer assignments using real data and standard statistical computer packages. Prerequisite: BIOST 517 or permission of instructor. Offered: W.

BIOST 519 Topics in Epidemiologic Methods (3) *Davis*
Introduces advanced methodologic methods, including recursive partitioning, developing clinical prediction rules, analyses of community-level associations or interventions,

case-crossover and case-only designs, propensity scores, two-stage sampling, and missing data imputation. Prerequisite: EPI 512; EPI 513. Offered: jointly with EPI 515. A.

BIOST 521 Biostatistics for Experimentalists

(4) Statistical aspects of design, data analytic models appropriate to classes of experiments most commonly employed in biomedical sciences. One-, two-way analyses of variance; factorial, crossed, nested, repeated measures designs. Clean, messy real-data sets analyzed using standard statistical computer packages. Prerequisite: either BIOST 511 and BIOST 512, or BIOST 517 and BIOST 518, or equivalent. Offered: alternate years; Sp.

BIOST 524 Design of Medical Studies (3)

Design of medical studies, with emphasis on randomized controlled clinical trials. Bias elimination, controls, treatment assignment and randomization, precision, replication, power and sample size calculations, stratification, and ethics. Suitable for graduate students in biostatistics and for research-oriented graduate students in other scientific fields. Prerequisite: BIOST 511 or equivalent, and one of BIOST 513, BIOST 518, STAT 421, STAT 423, STAT 512, or EPI 512; or permission of instructor. Offered: jointly with STAT 524; Sp.

BIOST 529 Sample Survey Techniques (3)

Design and implementation of selection and estimation procedures. Emphasis on human populations. Simple, stratified, and cluster sampling; multistage and two-phase procedures; optimal allocation of resources; estimation theory; replicated designs; variance estimation; national samples and census materials. Prerequisite: either STAT 421, STAT 423, STAT 504, QMETH 500, BIOST 511, or BIOST 517, or equivalent or permission of instructor. Offered: jointly with CS&SS 529/STAT 529.

BIOST 533 Classical Theory of Linear Models

(3) Introduction to one-, two-way analysis of variance; randomized blocks; fixed, random effects, multiple comparisons. Statistical distribution theory for quadratic forms of normal variables. Fitting of the general linear model by least squares. Prerequisite: BIOST 515, STAT 421 or STAT 423; and STAT 513; and a course in matrix algebra. Offered: jointly with STAT 533; Sp.

BIOST 534 Statistical Computing (3)

Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 534; Sp.

BIOST 535 Statistical Computing (3)

Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 535; A.

BIOST 536 Categorical Data Analysis in Epidemiology (4)

Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic

data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: BIOST 515; EPI 513 and either BIOST 513 or BIOST 518; or permission of instructor. Offered: jointly with EPI 536; A.

BIOST 537 Survival Data Analysis in

Epidemiology (4) Introduction to multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses appearing in the literature. Prerequisite: BIOST 536 or permission of instructor. Offered: jointly with EPI 537; W.

BIOST 538 Statistical Computing (3)

Introduction to scientific computing. Includes programming tools, modern programming methodologies, (modularization, object oriented design), design of data structures and algorithms, numerical computing and graphics. Uses C++ for several substantial scientific programming projects. Prerequisite: experience with programming in a high level language. Offered: jointly with STAT 538; W.

BIOST 540 Correlated Data Regression (3)

Introduction to regression modeling of longitudinal and clustered data from epidemiology and health sciences. Interpretation and familiarity with available programs gained by analysis of *bona fide* data; critiques of analyses appearing in literature. Prerequisite: Either BIOST 513, BIOST 515, BIOST 518, BIOST 536, or permission of instructor. Offered: Sp.

BIOST 550 Statistical Genetics I: Mendelian

Traits (3) *Thompson* Mendelian genetic traits. Population genetics; Hardy-Weinberg, allelic variation, subdivision. Likelihood inference, information and power; latent variables and EM algorithm. Pedigree relationships and gene identity. Meiosis and recombination. Linkage detection. Multipoint linkage analysis. Prerequisite: STAT 390 and STAT 394, or permission of instructor. Offered: jointly with STAT 550; A.

BIOST 551 Statistical Genetics II: Quantitative

Traits (3) *Monks* Statistical basis for describing variation in quantitative traits. Decomposition of trait variation into components representing genes, environment and gene-environment interaction. Methods of mapping and characterizing quantitative trait loci. Prerequisite: STAT/BIOST 550; STAT 423 or BIOST 515; or permission of instructor. Offered: jointly with STAT 551; W.

BIOST 552 Statistical Genetics III: Design and

Analysis (3) *Wijsman* Overview of probability models, inheritance models, penetrance. Association and linkage. The lod score method. Affected sib method. Fitting complex inheritance models. Design mapping studies; multipoint, disequilibrium, and fine-scale mapping. Ascertainment. Prerequisite: STAT/BIOST 551; GENET 371; or permission of instructor. Offered: jointly with STAT 552; Sp.

BIOST 570 Advanced Applied Statistics and

Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: STAT 512, 513; BIOST/STAT 533 or

STAT 421 and STAT 423, and a course in matrix algebra. Offered: jointly with STAT 570.

BIOST 571 Advanced Applied Statistics and

Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BIOST 570. Offered: jointly with STAT 571.

BIOST 572 Advanced Applied Statistics and

Linear Models (3) Generalized linear models, REML in mixed models for randomized blocks, split plots, longitudinal data. Generalized estimating equations, empirical model building, cross validation, recursive partitioning, generalized additive models, projection pursuit. Prerequisite: BIOST 571. Offered: jointly with STAT 572.

BIOST 573 Statistical Methods for Categorical

Data (3) Advanced topics in generalized linear models and the analysis of categorical data: overdispersion, quasilielihood, parameters in link and variance functions, exact conditional inference, random effects, saddlepoint approximations. Credit/no credit only. Prerequisite: BIOST 571 and STAT 582. Offered: jointly with STAT 573; alternate years; Sp.

BIOST 574 Multivariate Statistical Methods (3)

Use of multivariate normal sampling theory, linear transformations of random variables, one- and two-sample tests, profile analysis, partial and multiple correlation, multivariate ANOVA and least squares, discriminant analysis, principal components, factor analysis, robustness, and some special topics. Some computer use included. Prerequisite: BIOST 570 or permission of instructor. Offered: jointly with STAT 574; alternate years.

BIOST 576 Statistical Methods for Survival

Data (3) Statistical methods for censored survival data arising from follow-up studies on human or animal populations. Parametric and nonparametric methods, Kaplan-Meier survival curve estimator, comparison of survival curves, log-rank test, regression models including the Cox proportional hazards model, competing risks. Prerequisite: STAT 581 and either BIOST 515, STAT 473, or equivalent. Offered: jointly with STAT 576.

BIOST 577 Advanced Design and Analysis of

Experiments (3) Concepts important in experimental design: randomization, blocking, confounding. Application and analysis of data from randomized blocks designs, Latin and Graeco-Latin squares, incomplete blocks designs, split-plot and repeated measures, factorial and fractional replicates, response surface experiments. Prerequisite: BIOST 570 or STAT 421 (minimum 3.0) or permission of instructor. Offered: jointly with STAT 577.

BIOST 578 Special Topics in Advanced

Biostatistics (*, max. 3) Advanced-level topics in biostatistics offered by regular and visiting faculty. Prerequisite: permission of instructor. Offered: jointly with STAT 578; AWSpS.

BIOST 579 Data Analysis and Reporting (2)

Analysis of real data to answer scientific questions. Common data-analytic problems. Sensible approaches to complex data. Graphical and tabular presentation of results. Writing reports for scientific journals, research

collaborators, consulting clients. Graduate standing in statistics or biostatistics or permission of instructor. Offered: jointly with STAT 579; AWSp.

BIOST 580 Seminar in Biostatistics (*, max. 9) Presentation and discussion of special topics and research results in biostatistics. Speakers include resident faculty, visiting scientists, and advanced graduate students. Offered: AWSp.

BIOST 586 Martingales: Survival Analysis (3) Theory of counting processes and martingales to provide unified study of survival analysis methods. Focus on survival distribution estimators, censored data rank statistics, regression methods with censored survival data. Development of small samples moments, asymptotic distributions, and efficiencies. Prerequisite: STAT 521 or STAT 583 or permission of instructor; recommended: STAT 576. Offered: jointly with STAT 586; alternate years; W.

BIOST 590 Biostatistical Consulting (*) Training in consulting on the biostatistical aspect of research problems arising in the biomedical field. Students, initially under the close supervision of a faculty member, participate in discussions with investigators leading to the design and/or the analysis of a quantitative investigation of a problem. With experience, independent associations of student and research worker are encouraged, with subsequent review by faculty of resulting design and analysis. Prerequisite: permission of instructor. Offered: AWSpS.

BIOST 593 Cancer Prevention Research Laboratory (3) *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Credit/no credit only. Offered: jointly with EPI 593; AWSpS.

BIOST 595 Biostatistics Master's Practicum (1-12, max. 12) Supervised practice experience providing students an opportunity to learn how biostatistics is applied in a public health setting and in the formation of public health policy. Prerequisite: 514; 515; 536; 537.

BIOST 598 Techniques of Statistical Consulting (1) Seminar series covering technical and non-technical aspects of statistical consulting, including skills for effective communication with clients, report writing, statistical tips and rules of thumb, issues in survey sampling, and issues in working as a statistical consultant in academic, industrial, and private-practice settings. Prerequisite: entry code. Offered: jointly with STAT 598; ASp.

BIOST 600 Independent Study or Research (*) Offered: AWSpS.

BIOST 700 Master's Thesis (*) Offered: AWSpS.

BIOST 800 Doctoral Dissertation (*) Offered: AWSpS.

Environmental and Occupational Health Sciences

ENV H 111 Exploring Environment and Health Connections (3) *I&S Camp, Keifer* Introduction to environmental health concepts. Examines

current events to illustrate and better appreciate the relationship between environment and health and to explore whether an environmental condition is or is not an important threat to health. Emphasizes the roles of environmental scientists and related professionals. Offered: A.

ENV H 205 Environmental Health in Film (2) *I&S Fenske, Luchtel* Viewing and discussion of popular films that explore issues in environmental health. After viewing films, a discussion follows focusing on the ethical, legal, social, and scientific issues raised by the films. Intended for UW freshmen and sophomores from all backgrounds who may have an interest in majoring in Environmental Health. Offered: W.

ENV H 311 Introduction to Environmental Health (3) *NW Treser* Relationship of people to their environment, how it affects their physical well-being and what they can do to influence the quality of the environment and to enhance the protection of their health. Emphasis on environmental factors involved in transmission of communicable diseases and hazards due to exposure to chemical and physical materials in our environment. Offered: ASp.

ENV H 405 Toxic Chemicals and Human Health (3) *Gallagher, Kavanagh* Basic principles governing the behavior and effects of toxic chemicals released into the environment; sources, distribution, and fate of toxic chemicals in the environment; chemicals and cancer; chemicals and birth defects; government regulation of chemical hazards. Focus on human health impacts of chemicals found in the workplace and general environment. Prerequisite: 2.0 in BIOL 220; and 2.0 in CHEM 224 or 2.0 in CHEM 239 or 2.0 in CHEM 337. Offered: Sp.

ENV H 417 Non-Ionizing Radiation and Electrical Safety (2) *Yost* Introduction to health hazards from UV, optical laser hazards, infrared radiation, radio-frequency radiation, heat stress, electrical shock, electric and magnetic fields. Application of current standards for these physical agents. Emphasis on occupational hazards with additional discussion of environmental exposures where appropriate. Offered: odd years; W.

ENV H 431 Environmental and Occupational Sampling and Analysis I (3) *NW Fenske, Yost* Laboratory and lecture on sampling. Field and laboratory analysis of chemical and physical agents found in the occupational and ambient environments. Prerequisite: CHEM 162; PHYS 116/119; ENV H 311. Offered: A.

ENV H 432 Environmental and Occupational Sampling and Analysis II (4) *NW Simpson* Laboratory and lecture on sampling. Field and laboratory analysis of chemical and physical agents found in the occupational and ambient environments. Prerequisite: ENV H 431. Offered: W.

ENV H 433 Environmental and Occupational Sampling and Analysis III (4) *NW Butterfield, Meschke* Laboratory and lecture related to the evaluation of water quality. The identification and analysis of microorganisms in water, food, and air. Prerequisite: ENV H 431; MICROM 301. Offered: Sp.

ENV H 440 Water, Wastewater and Health (3) *Butterfield, Meschke* Review of water supply, water quality, and water/wastewater treatment as they relate to human health. Includes water law

and regulations, source water protection, basic treatment technologies for water and waste, chemical and microbial contaminants, and recreational water. Prerequisite: ENV H 311. Offered: A.

ENV H 441 Food Protection (3) *Easterberg* Study of identification and characteristics of chemicals and biological agents implicated in foodborne disease outbreaks and conditions or circumstances by which food contamination occurs. Examination of food protection activities conducted by local and state government at the retail level. Prerequisite: either 2.0 in CHEM 155 or 2.0 in both CHEM 160 and CHEM 161, or 2.0 in CHEM 162; 2.0 in MICROM 302. Offered: W.

ENV H 442 Vector Control (3) *Treser* Study of the impact and control of rodents and arthropod vectors of disease, including consideration of economic poisons used, their regulation, and safety measures. Prerequisite: 2.0 in BIOL 203. Offered: Sp.

ENV H 445 Solid Waste Management (3) *Busch* Examination of the public health, environmental, economic, and materials conservation aspects of solid wastes management; amounts and sources of solid wastes, waste reduction and recycling, methods of storage, transportation and disposal, integrated waste management, identification of present problems and future needs. Prerequisite: 2.0 in CHEM 155, 2.0 in CHEM 160, or 2.0 in CHEM 162; either 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 134, or 2.0 in MATH 144; recommended: PHYS 115. Offered: Sp.

ENV H 446 Hazardous Waste Management (3) *Kissel* Characterization of hazardous wastes and introduction to pertinent federal and state regulations. Discussion of exposure pathways and description of management options at pre-generation, pre-release, and post-release stages. Emphasis on public health significance. Supplemented with case studies. Prerequisite: either 2.0 in CHEM 155, 2.0 in CHEM 160, 2.0 in CHEM 162; either 2.0 in MATH 112, 2.0 in MATH 124, 2.0 in MATH 127, 2.0 in MATH 234, or 2.0 in MATH 144; recommended: MATH 125, CHEM 224, PHYS 115. Offered: W.

ENV H 449 Health Effects of Air Pollution (2) *Koenig* Structure and function of the respiratory system and the changes that may be produced by specific air pollutants, such as ozone, SO₂ and fine particles. Air quality criteria and the economic costs of disease are discussed. Several classroom demonstrations. Offered: even years; W.

ENV H 451 Ecology of Environmentally Transmitted Microbiological Hazards (3) *Butterfield, Meschke, Shin* Focuses on the transmission of infectious microorganisms by air, food, water, and other environmental media. Provides an introduction to environmentally transmitted pathogens, and discusses factors affecting their environmental fate, transport, and persistence. Offered: A.

ENV H 452 Detection and Control of Environmentally Transmitted Microbiological Hazards (3) *Butterfield, Meschke, Shin* Focuses on the detection and control of infectious microorganisms in air, food, water, and other environmental media. Provides a discussion on sample collection, processing and detection for infectious microorganisms. Provide coverage of engineered controls and disinfection/decontamination processes for infectious microorganisms. Recommended: ENV H 451. Offered: W.

ENV H 453 Industrial Hygiene (3) *Morgan* Introduction to the principles and scientific foundation of industrial hygiene. Examines the anticipation, recognition, evaluation, and control of work place hazards to health and safety. Focuses on the first three functions, but includes some consideration of control methods. Prerequisite: either BIOL 200 or BIOL 202; CHEM 224; either PHYS 116 or PHYS 123. Offered: A.

ENV H 457 Industrial and Environmental Noise (3) *Neitzel, Seixas* Survey of industrial and community noise problems, including sources, effects, measurement, control, and legislation. Prerequisite: 2.0 in PHYS 115. Offered: Even years, Sp.

ENV H 461 Air Pollution Control (4) *Pilat* Fundamental concepts of air pollution. Emission sources, atmospheric dispersion, ambient concentrations, adverse effects, governmental regulations, emission standards, air-quality standards, processes and equipment for controlling emissions. Offered: jointly with CEE 490; A.Sp.

ENV H 470 Environmental Health Practice: Administration and Management (2) *Osaki, Treser* Explores selected aspects of the management of environmental health programs in the community, including organization theory and practice, budgeting, personnel management, program planning and evaluation, and community relations. Prerequisite: ENV H 482. Offered: A.

ENV H 471 Environmental Health Regulation (3) *Treser* Introduction to administrative regulation and process. Authority, jurisdiction, and structure of environmental control programs and agencies; the regulatory process; agency acquisition and retention of information; administrative actions; enforcement of environmental health laws; major statutes and cases affecting programs. Prerequisite: ENV H 482. Offered: W.

ENV H 472 Environmental Risk and Society (3) *Fenske* Examines scientific determinations of environmental risks and explores how such determinations are evaluated by affected communities and society. Employs risk analysis to integrate technical knowledge in hazard identification and exposure assessment to provide a more rational basis for environmental policies. Role of public participation in risk-based decision making discussed. Offered: A.

ENV H 480 Environmental Health Problems (*, max. 6) *Treser* Individual projects involving library, laboratory, or field study of a specific environmental health problem. Offered: AWSpS.

ENV H 482 Environmental Health Internship (2-15, max. 15) *Treser* Assignment to an environmental health or environmental protection agency for supervised observation and experience in environmental health technology, program planning and utilization of community resources. Prerequisite: 2.5 in ENV H 311. Credit/no credit only. Offered: AWSpS.

ENV H 490 Community Air Pollution (3) NW *Liu* Fundamental concepts of ambient and indoor air pollution, focusing on air quality issues affecting public health. Discusses sources of air pollution, building dynamics, microenvironments and activity patterns, biological air contaminants, community air pollution issues, management strategies, and monitoring and modeling skills. Offered: Sp.

ENV H 497 Environmental Health Special Electives (*) Offered: AWSpS.

ENV H 499 Undergraduate Research (*) Individual research on a specific topic in environmental health upon which specific conclusions, judgments, or evaluation can be made or upon which facts can be presented. Offered: AWSpS.

ENV H 511 Environmental and Occupational Health (1-3, max. 3) *Daniell* Effects of exposure to chemical, physical, and biological agents, embracing the community and workplace environments. Current issues, using specific cases from recent literature as basis for classroom discussion and written assignments. Offered: W.

ENV H 512 Waste Management, Recycling, and Pollution Control (3) *De Walle* Survey of selected technological components of environmental health infrastructure via lecture and weekly field trips to full facilities. Sites visited vary year to year, but may include paper and steel plants using reclaimed feedstock, cement kiln using waste as supplemental fuel, municipal wastewater treatment facility, and steam generation plant.

ENV H 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and toxicogenomics. Emphasis placed on applications of genomic technologies to the understanding of "gene-environment interactions" that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H/PCEUT 513.

ENV H 514 Environmental and Occupational Toxicology I (3) *Xia* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: A.

ENV H 515 Environmental and Occupational Toxicology II (3) *Luchtel* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: W.

ENV H 516 Environmental and Occupational Toxicology III (3) *Costa* Major topical areas in human and environmental toxicology, including the biochemical, cellular, and physiological mechanisms by which chemicals produce toxic responses; the toxicology of the major classes of chemicals; principles of toxicity testing; interpretation of toxicological data. Prerequisite: BIOL 212, BIOC 440, or permission of instructor. Offered: Sp.

ENV H 517 Children's Environmental Health (3) *Burbacher* Discussion of environmental health issues as they pertain to children's health. Includes historical perspective of public health

research and policies directed at protecting children's health and emerging scientific and public health issues such as childhood exposure to mercury and pesticides, childhood asthma, cancer, and environmental justice. Offered: Sp.

ENV H 531 Neurotoxicology (3) *Costa* Advanced discussions of the principles and methodological approaches to neurotoxicology (including behavioral toxicology), classes of neurotoxic agents, types and mechanisms of neurotoxic effects, as well as the role of neurotoxicology in toxicology and public health. Prerequisite: ENV H 514, ENV H 515, ENV H 516 or ENV H 405 or permission of instructor. Offered: even years; W.

ENV H 532 Reproductive and Developmental Toxicology (2) *Faustman* Investigates chemicals that can induce adverse reproductive and developmental outcomes. Discussion topics include identification and characterization of specific classes of toxic agents, mechanisms of action of these agents at the molecular and cellular level, and risk assessment and regulatory issues. Prerequisite: ENV H 514 and ENV H 515 or ENV H 405 or permission of instructor. Offered: even years; S.

ENV H 533 Molecular Toxicology (2) *Gallagher* Advanced discussion of molecular mechanisms whereby chemical, physical, and biological agents produce their harmful effects on biological tissues. Prerequisite: permission of instructor. Offered: jointly with PHCOL 533; odd years; W.

ENV H 535 Inhalation Toxicology (3) *Koenig, Luchtel* Advanced course on the toxicology of air pollutants and the response of the respiratory system to inhaled gaseous and particulate toxicants. Issues and concepts covered include biology of the respiratory system, exposure technology, experimental design and methodological issues, health effects of air pollutants, and regulatory aspects. Prerequisite: ENV H 514-516, or ENV H 405 or permission of instructor. Offered: even years; A.

ENV H 537 Introduction to Manufacturing Systems (3) *Storch* Description of manufacturing systems. Includes discussion of current trends in manufacturing, especially lean principles. Introduces process flow analysis, manufacturing organizations including job-shop, assembly lines, and group technology, manufacturing inventory philosophies (just-in-time, MRP, OPT), work environment, and work simplification. Offered: jointly with IND E 537; A.

ENV H 541 Ecology of Environmentally Transmitted Microbial Hazards (3) Focuses on the transmission of infectious microorganisms by air, food, water, and other environmental media. Provides an introduction to environmentally transmitted pathogens, and discusses factors affecting their environmental fate, transport, and persistence. Offered: A.

ENV H 542 Detection and Control of Environmentally Transmitted Microbial Hazards (3) Focuses on the detection and control of infectious microorganisms in air, food, water, and other environmental media. Provides a discussion on sample collection, processing, and diction for infectious microorganisms. Provides coverage of engineered controls and disinfection/decontamination processes for infectious organisms. Offered: W.

ENV H 543 Quantitative Microbial Risk Assessment (3) Focuses on the principles of

quantitative risk assessment as applied to infectious microorganisms. Covers hazard identification, exposure assessment, health effects assessment, risk characterization, and risk communication. Offered: Sp.

ENV H 545 Water, Wastewater and Health (4) *Butterfield, Meschke* Review of water supply water quality, and water/wastewater treatment as they related to human health. Includes water law and regulations, source water protection, basic treatment technologies for water and waste, chemical and microbial contaminants, and recreational water. Offered: A.

ENV H 546 Pesticides and Public Health (3) *Fenske, Keifer* Examines health risks and benefits associated with pesticide use in the United States and internationally; reviews exposure, toxicity, epidemiology, and regulation of pesticides, focusing on populations such as workers and children; discusses benefits derived from vector control, food production, and food preservation. Offered: odd years; W.

ENV H 550 Microscopy: Image Acquisition and Analysis (2) *Luchtel* Sample preparation methods, principles and practical aspects of light microscopy (bright-field, phase, differential interference, polarizing, and confocal), electron microscopy (transmission, scanning, electron diffraction, and energy dispersive x-ray analysis), photographic and digital imaging, computerized image analysis techniques. Student research project required. Prerequisite: permission of instructor.

ENV H 552 Environmental Chemistry of Pollution (4) *Kalman, Liu* Chemical and physical processes determining distribution and fate of chemical hazards, detection of low levels of hazardous compounds, and environmental evaluation and prediction. Fundamental chemical concepts and measurable properties of individual compounds to interpret and relate measurements. Prerequisite: admission to graduate program or permission of instructor. Offered: W.

ENV H 553 Instrumental Methods for Industrial Hygiene Measurement: Lecture (3) *Morgan* Strategy, methods, instrumentation, and theory of atmospheric sampling and analysis, emphasizing evaluation of potential occupational hazards and exposures to chemical agents. Prerequisite: ENV H 453 or permission of instructor. Offered: W.

ENV H 555 Instrumental Methods for Industrial Hygiene Measurement: Laboratory (3) *Monteith, Simpson, Yost* Utilizes typical instrumental techniques and analytical methods for the evaluation of potential occupational exposures. Prerequisite: ENV H 453 and ENV H 553 or permission of instructor. Offered: Sp.

ENV H 556 Quantitative Occupational Exposure Analysis (3) *Seixas* Exploration of industrial hygiene data to understand nature of airborne exposures in the occupational environment, and their interpretation for human health. Focus on reading and discussion of primary exposure assessment literature and statistical analysis of *real* dataset. Prerequisite: one quarter of statistics or biostatistics and basic industrial hygiene. Offered: W.

ENV H 557 Workplace Exposure Controls (4) *Yost* Principles of engineering controls and protective equipment needed to prevent overexposures to workplace contaminants, including design of industrial ventilation systems,

general building ventilation and indoor air quality, respiratory protection, and protective clothing. Offered: even years, W.

ENV H 559 Applied Occupational Health and Safety (3) *Camp, Johnson* Application of occupational safety and health principles. Student teams perform evaluations, assess production methods/processes and exposures, health and safety procedures and programs, and develop engineering and administrative controls. Students perform on a consulting project with a local company including budgeting, project reporting, and presentation. Offered jointly with IND E 567 and NSG 505. Offered: Sp.

ENV H 560 Organizing and Administering Industrial Safety and Health Programs (4) *Gleason* Explores industrial organization and methods of integrating safety and industrial hygiene programs with industrial operations. Investigates philosophic issues related to industrial safety and health such as responsibility for safety, dependency on safe practice, and hierarchy of prevention. Contains numerous case problems and student involvement opportunities. Offered: jointly with NSG 506; A.

ENV H 562 Technical Aspects of Safety and Health (3) *Gleason* Explores specific hazards associated with major industries, as well as hazards common to all industries. Covers machine guarding, electrical safety, systems safety analysis, materials handling, and working at heights. Offered: jointly with NSG 507; W.

ENV H 564 Recognition of Health and Safety Problems in Industry (4) *Camp, Seixas* Develops skills in occupational health and safety hazard recognition in a variety of important northwest industries. Focuses on process understanding and hazard recognition skills during walk-through inspections of several local facilities, stressing a multidisciplinary approach. Offered: jointly with IND E 564; A.

ENV H 565 Occupational Stress and Management (3) *Beaton* Relationships between occupational stressors and worker's health, well-being, productivity. Analyzes models of occupational stress. Investigates similarities, differences between job-related stressors and stress responses in various occupations. Explores elements of worksite stress management programs. Prerequisite: graduate standing in nursing or allied health discipline. Offered: jointly with NURS 566; even years; A.

ENV H 566 Introduction to Ergonomics (3) *Johnson, Stewart* Basic principles of ergonomics in work environment applied to problems of worker and management. Topics include measurement of physical work capacity, problems of fatigue and heat stress, applied biomechanics, worker-machine interactions and communication, design of displays and controls. Prerequisite: basic human physiology or permission of instructor. Offered: jointly with IND E 566/NSG 508; W.

ENV H 567 Mechanisms of Carcinogenesis (2) *Xia* Lectures/presentations of biochemical and molecular basis of carcinogenesis induced by environmental agents, including approaches to identification of carcinogens. Role of cell proliferation and cell death (apoptosis) in cancer formation and cancer treatment. Molecular mechanisms that regulate proliferation and apoptosis. Prerequisite: ENV H 516, ENV H 405, or permission of instructor. Offered: jointly with PHCOL 567; even years, A.

ENV H 568 Molecular Epidemiology of Infectious Diseases (2) *r* Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: ENV H 511 or ENV H 512 or permission of instructor. Offered: jointly with EPI 568/PABIO 568; W.

ENV H 569 Occupational Biomechanics (4) *Johnson* Lectures and laboratories address human occupational biomechanical and physiological limits and measurement, analysis, and modeling techniques that are used by ergonomists for design of safe, healthful, and productive physical work. Prerequisite: ENV H 566 or permission of instructor. Offered: jointly with IND E 569; even years, Sp.

ENV H 570 Occupational and Environmental Epidemiology (3) *Checkoway, Daniell* Research in occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with EPI 570; Sp.

ENV H 571 Neuroepidemiology and Environmental Risk Factors (3) Focus on neurologic diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: EPI 511 or equivalent. Offered: jointly with EPI 571; odd years; W.

ENV H 572 Clinical Occupational Medicine (2) *Shusterman* For clinicians in training, comprehensive overview of occupational disease principles, occupational history-taking, and the provider's role in workers' compensation. Epidemiologic evidence and pathophysiologic basis for occupational diseases reviewed, emphasizing organ system approach to diagnosis and management. Prerequisite: occupational medicine or preventive medicine residents/fellows, nursing students, or permission of instructor. Offered: S.

ENV H 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3) Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with EPI 573; W.

ENV H 574 Quantitative Methods for Environmental Exposure Assessment (3) *Kissel* Examination of probabilistic (in contrast to deterministic) approaches to prediction of human exposure to environmental contaminants including explicit separation of population variability from uncertainty due to ignorance. Discussion of data needs, pitfalls, policy ramifications, and current state of development and regulatory acceptance. Examples from real world. Offered: Sp.

ENV H 577 Risk Assessment for Environmental Health Hazards (3/4) *Faustman* Examines context, methodologies, data, uncertainties, and institutional arrangements for risk assessment. Qualitative and quantitative approaches to identification, characterization, and control of environmental hazards to health emphasized through didactic and case studies. Prerequisite: ENV H 515 and BOST 511 or permission of instructor. Offered: jointly with CEE 560/PB AF 589; A.

ENV H 580 Environmental Health and Occupational Health Sciences Seminar (1, max. 6) Presentation of current environmental and occupational health research and issues. Credit/no credit only. Offered: AWSp.

ENV H 581 Environmental Health Reading I (1) Critical reading of selected basic and applied research publications on environmental health problems and programs. Offered: A.

ENV H 582 Environmental Health Reading II (1) Discussion of controversial and current issues facing public health and the environmental health professional.

ENV H 583 Environmental Health Reading III (1) Preparation and presentation of master's thesis proposal. Offered: Sp.

ENV H 584 Occupational Health and Safety: Policy and Politics (3) *Camp, Morris* Designed to provide a better understanding of the historical, political, and policy issues in occupational health and safety through selected readings and discussion with experts in the field. Particular emphasis on the Occupational Safety and Health Act. Students present testimony in a mock congressional hearing on a health and safety issue. Offered: Sp.

ENV H 598 MPH Degree Program Project (*, max. 18) Supervised project work on a topic related to student's concentration in graduate study that results in a paper. Offered: AWSpS.

ENV H 590 Selected Topics (1-6, max. 6) In-depth study of a current environmental health topic. For more information and permission, consult department program adviser. Offered: AWSpS.

ENV H 591 Current Topics in Toxicology (1, max. 6) *Kavanagh, Xia* Provides in-depth examination of current topics in environmental and occupational toxicology taken from recently published journal articles. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Assigned weekly readings given according to the schedule of speakers and topics. Credit/no credit only. Offered: AWSp.

ENV H 592 Current Topics in Occupational Health Sciences (1/3) Weekly discussion of current research on a broad range of topics relevant to occupational and environmental health including exposure assessment, occupational epidemiology, occupational hygiene, and control of environmental hazards. Presentation and discussion sessions designed to help students organize and prepare a critical analysis of research findings. Credit/no credit only. Offered: A.

ENV H 593 Current Topics in Risk Assessment (1, max. 6) *Faustman* Examines current topics in risk assessment and risk communication with a focus on issues in environmental

health. Consists of presentations led by students, postdoctoral fellows, and faculty. Students expected to participate actively in discussion. Credit/no credit only. Offered: AWSp.

ENV H 594 Current Topics in Environmental Health (1, max. 2) Critical review and discussion of current scientific literature of particular relevance to the Environmental Health program. Primary presentations rotate among faculty and students. Credit/no credit only. Offered: W.

ENV H 595 Research Rotation (3, max. 9) Research laboratory rotation for predoctoral graduate students. Students commit to a laboratory research project aimed at introducing the student to current methods in laboratory research, and to familiarize the student with specific faculty research interests. Prerequisite: graduate standing and permission of program director. Offered: AWSpS.

ENV H 596 Current Issues in Occupational and Environmental Medicine (2, max. 12) *Kaufman* Interdisciplinary seminar on current and emerging topics in the practice of environmental and occupational health. Faculty- and student-led presentations with an interdisciplinary focus, including occupational hygiene, nursing, and medical issues. Prerequisite: environmental health graduate student, occupational health nursing student, or permission of instructor. Offered: jointly with NURS 580; AWSp.

ENV H 599 Field Studies (2-6, max. 6) Assignment to an environmental research or service program to develop field research and evaluation skills. Credit/no credit only. Offered: AWSpS.

ENV H 600 Independent Study or Research (*) Prerequisite: permission of departmental adviser. Offered: AWSpS.

ENV H 700 Master's Thesis (*) Prerequisite: permission of departmental adviser. Offered: AWSpS.

ENV H 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of departmental adviser. Offered: AWSpS.

Epidemiology

Epidemiology

EPI 101 Public Health Issues in the Media (5) I&S *DeRoos* Reviews epidemiologic studies and popular media to compare original research results with the message disseminated to the public, and to analyze how and why data from public health research can sometimes be misleading to the public.

EPI 405 Phys Activity in Health and Disease (3) *Duncan* Impact of physical activity on individual and public health. Overview of physiological adaptations to activity, exercise prescription, exercise epidemiology, and prevention of chronic diseases. Public health recommendations for activity in the U.S. population, and the effects of the built environment on activity. Prerequisite: BIOL 118. Offered: jointly with NUTR 405; Sp.

EPI 420 Introduction to Epidemiology (3) NW *Goldberg* For the undergraduate student wishing to devote only one quarter to a course in epidemiologic methods. Description of ways in which variation in disease occurrence is

documented and how that variation is studied to understand causes of disease. Offered: Sp.

EPI 497 Epidemiology Special Electives (*) Off-campus course for medical students. Offered: AWSpS.

EPI 499 Undergraduate Research (*) Offered: AWSpS.

EPI 502 Phys Activity in Health and Disease (3) *Duncan* Impact of physical activity on individual and public health. Overview of physiological adaptations to activity, exercise prescription, exercise epidemiology, and prevention of chronic diseases. Public health recommendations for activity in the U.S. population, and the effects of the built environment on activity. Prerequisite: BIOL 118. Offered: jointly with NUTR 505; Sp.

EPI 503 Public Health Informatics and Surveillance (3) Covers collection and use of public health surveillance data in formulating policy and managing programs through lectures and real-world interactive exercises. Discusses surveillance for birth defects, environmental exposures, and hospital-acquired infections, and use of tools such as small area analysis and geographic information systems. Offered: jointly with HSERV 503.

EPI 507 HIV and STIs in Women and Children (3) Examines the emerging global public health crisis and the plight of women and children with HIV/STIs. Reviews targeted approaches pertaining to women and children and their vulnerability to HIV/STIs. Prerequisite: EPI 511 or EPI 512-513. Offered: jointly with OB GYN 590; Sp.

EPI 511 Introduction to Epidemiology (3-4, max. 4) *Kukull* Epidemiologic methods for non-epidemiology majors. Focuses on research designs and methods to describe disease occurrence and risk factor associations; uses quantitative and biomedical information to infer whether causal relationships exist between potential causes and disease in populations. Offered: A.

EPI 512 Epidemiologic Methods I (4) *Koepsell, Weiss* Principles and methods of epidemiology. Covers measures of disease frequency, measures of effect, causal inferences, descriptive epidemiology, study types, misclassification, and effect modification. Designed for students who want to take 513. Prerequisite: prior or concurrent enrollment in BOST 511 or equivalent. Offered: A.

EPI 513 Epidemiologic Methods II (4) *Koepsell, Weiss* Continuation of 512. Considers how designs of epidemiologic studies may be constructed to maximize etiologic inferences. Covers confounding, randomized trials, cohort studies, case-control studies, and selected topics. Prerequisite: EPI 512. Offered: W.

EPI 514 Application of Epidemiologic Methods (4) *Hawes, Mueller, Schiff* Practical experience in analysis of data. Students analyze data sets currently on file using contemporary epidemiologic methods as taught in 512 and 513. Prerequisite: EPI 510 or experience in statistical programming; EPI 512, EPI 513 and epidemiology major. Offered: Sp.

EPI 515 Topics in Epidemiologic Methods (3) Introduces advanced methodologic methods, including recursive partitioning, developing

clinical prediction rules, analyses of community-level associations or interventions, case-crossover and case-only designs, propensity scores, two-stage sampling, and missing data imputation. Prerequisite: EPI 512; EPI 513. Offered: jointly with BIOST 519; A; odd years.

EPI 516 Statistical Methods in Genetic Epidemiology (3) *Monks* Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BIOST 513 or BOST 518; PHG 511/EPI 517; or permission of instructor. Offered: jointly with BOST 516/PHG 519.

EPI 517 Genetic Epidemiology (3) *Austin* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BOST 511, and GENET 371, or equivalent. Offered: jointly with PHG 511.

EPI 518 Computer Demonstrations in Genetic Epidemiology (2-4, max. 4) *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Laboratory sections apply methods to data provided by instructor. Corequisite: EPI 517/PHG 511 or permission of instructor. Offered: jointly with PHG 518.

EPI 519 Epidemiology of Cardiovascular Disease (3) *Psaty, Sisovick* Principles, methods, and issues in the epidemiology of cardiovascular disease. Focuses on coronary heart disease and its major risk factors; also covers other topics such as stroke and sudden death. The format includes informal lectures and discussions of the current literature. Prerequisite: EPI 511 or EPI 512, EPI 513. Offered: A.

EPI 520 Epidemiology of Infectious Diseases (3) *Manhart* Infectious diseases from a public health perspective. Topics include analytic methods, study design, outbreak investigations, surveillance, vaccine evaluations, global eradication, screening, modeling, and infectious causes of chronic diseases. Homework and discussion based on current examples from the published literature. Prerequisite: EPI 511, EPI 512, or permission of instructor. Offered: W.

EPI 521 Epidemiology of Maternal and Child Health Problems ([3-4], max. 4) *Schiff, Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical, or dental school standing and EPI 511 or EPI 512 or permission of instructor. Offered: jointly with HSERV 542; W.

EPI 522 Reproductive Epidemiology (3) *Holt* Focus on conditions and diseases of the female reproductive system, as well as pregnancy outcomes other than birth. Presentation of current epidemiologic knowledge and discussion of issues on topics including contraception; infertility; spontaneous abortion; induced

abortion; breast, uterine, and ovarian disease; and menopause. Prerequisite: EPI 511 or EPI 512-513. Offered: odd years; Sp.

EPI 523 Injury Epidemiology (3) Discussion of research methods which are useful in studying the causes of injury and outcomes after injury. Information regarding the impact of injuries on health and known or suspected risk factors for some injuries. Assigned readings from literature in the field. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: Sp.

EPI 524 Epidemiologic Studies of Cancer Etiology and Prevention (3/4) *Deroos, Li* Current knowledge of the role of environmental factors (e.g., smoking, hormonal, nutrition, viral, radiation) and genetic susceptibility in the etiology of several major cancers. Illustrates principles and conduct of research in cancer etiology and cancer prevention. Prerequisite: EPI 511 or EPI 513. Offered: W.

EPI 526 Epidemiology of Diseases Communicable from Nature (3) *DiGiacomo, Rausch, Weigler* Explores the public health aspects of zoonotic diseases, their epidemiology and approaches to control. Focuses on the major viral, rickettsial, bacterial, protozoal, helminthic, and fungal diseases transmitted from wild and domesticated animals to humans. Prerequisite: EPI 511, EPI 512, or EPI 520 or permission of instructor. Offered: jointly with C MED 526; Sp.

EPI 528 Exposure Measurement in Epidemiology (3) *White* Principles and methods of measuring exposures and covariates in epidemiological studies. Validity and reliability of measures, questionnaire design, effects of measurement error, maximizing response rates, quality-control procedures, measurement of specific exposures. Credit/no credit only. Prerequisite: EPI 513. Offered: Sp.

EPI 529 Emerging Infections of International Public Health Importance (3-, max. 3) *Kimball* Overview of current emerging infections worldwide and contributing factors. Design of a surveillance and prevention strategy required. Offered: jointly with HSERV 536; in residence, even years; online, odd years; W.

EPI 530 AIDS: A Multidisciplinary Approach (2) *Farquhar* Comprehensive overview of the public health, clinical, and laboratory aspects of human immunodeficiency virus (HIV) infection and disease. Topics include the pathogenesis, natural history, and management of HIV infections. The impact of HIV/AIDS on community and global health care and prospects for prevention and control. Credit/no credit only. Offered: jointly with MED 530; A.

EPI 531 Problems in International Health (4) *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with HSERV 531; A.

EPI 532 Epidemiology of Infectious Diseases in Resource-Limited Countries (3) *McLelland A* review of major infectious disease problems of the developing world, including AIDS, malaria, tuberculosis, measles, and diarrhea, with an emphasis on public health control strategies.

EPI 533 Pharmacoepidemiology (3) *Heckbert, Johnson* Overview of pharmacoepidemiology including drug development and approval; application of epidemiologic methods to study drug safety and effectiveness; exploration of the interplay between research and public policy; introduction to resources for information about drugs; introduction to pharmacology principles pertinent to pharmacoepidemiology. Prerequisite: health sciences graduate student or with permission. Offered: jointly with PHARM 533; even years; Sp.

EPI 534 Principles of Publishing Clinical Evidence (2) *Johnson, Olson* Explains advanced methodologic principles for improving the clarity of published clinical evidence. Students prepare and revise a 1000-word research letter for *The Lancet* using their own clinical evidence. Credit/no credit only. Prerequisite: permission of instructor. Offered: jointly with PHARM 536; Sp.

EPI 536 Categorical Data Analysis in Epidemiology (4) Summary of univariate categorical data analysis; introduction to multivariate analysis of categorical epidemiologic data using multiplicative models. Experience at interpretation; familiarity with available programs gained by analysis of bona fide data, critiques of analyses appearing in literature. Prerequisite: BOST 515; EPI 513 and either BOST 513 or BOST 518; or permission of instructor. Offered: jointly with BOST 536; A.

EPI 537 Survival Data Analysis in Epidemiology (4) Introduction to the multivariate analysis of survival data using multiplicative models. Application to epidemiologic studies. Familiarity with interpretation and available computer programs gained by analysis of bona fide sets of data and critiques of analyses appearing in the literature. Prerequisite: EPI 536 or permission of instructor. Offered: jointly with BOST 537; W.

EPI 538 Nutritional Epidemiology (3) *Beresford, Drewnowski* Application of epidemiological methods to current studies of diet, nutrition, and chronic disease. A discussion of current issues and controversies enable students to plan studies in nutritional epidemiology and disease prevention. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with NUTR 538; A.

EPI 539 Research Methods in Developing Countries (3/4) *Gloyd, Mock* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with HSERV 539; W.

EPI 540 Introduction to Cancer Biology (3) *Ulrich* Provides a general understanding of cancer biology, covering the carcinogenic process and various biological causes of cancer. Integrates knowledge from different fields of cancer research, guiding students through diverse literature on cancer and carcinogenesis. Prerequisite: GENOME 372, or permission of instructor. Offered: even years; Sp.

EPI 542 Clinical Epidemiology (2) *Weiss* Principles and methods involved in studying outcome of illness. Prerequisite: EPI 511, or EPI 512 and EPI 513. Offered: S.

EPI 544 Maternal and Child Health in Developing Countries (3) *Mercer* Emphasizes critical health problems of women and children in developing countries in social, economic, and cultural contexts. Practical approaches to developing MCH programs shared via lecture/discussions, exercises, and small group work. Students acquire skills in baseline assessment, setting objectives, planning and evaluating interventions, and involving communities. Offered: jointly with HSERV 544; Sp.

EPI 546 Psychosocial Epidemiology (3) *Vander Stoep* Application of epidemiological methods to the study of mental illnesses. Topics include occurrence and distribution of mental illness, classification of psychiatric disorders; treatment-based vs. community-based studies; epidemiology of depression and schizophrenia; familial transmission; developmental epidemiology; mental illness and violence. Prerequisite: one course in epidemiology or permission of instructor. Offered: jointly with PBSCI 546; Sp.

EPI 548 Social Determinants of Health Research Methods (3) *Beresford, Smith* Explores study design, measurement and analytic issues applicable to research into the social determinants of health. Semi-weekly graduate-level seminar offered to students with a basic knowledge of epidemiological and biostatistical principles. Prerequisite: either EPI 511 or EPI 512/EPI 513; BOST 511/BOST 512 or BOST 517/BOST 518. Offered: jointly with HSERV 548; W.

EPI 549 Sociobehavioral and Prevention Research Methods for HIV and STI (3) *Kurth* Focuses on prevention methods for controlling HIV/STI epidemics, identifying a range of alternatives along the prevention continuum as most appropriate and feasible for settings and populations, and solutions to increase HIV/STI prevention agenda in public health and clinical policy and practice. Offered: jointly with NMETH 515; Sp.

EPI 568 Molecular Epidemiology of Infectious Diseases (2) *DiGiacomo, Samadpour, Roberts* Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: EPI 511 or EPI 512 or permission of instructor. Offered: jointly with ENV H 568/PABIO 568. Offered: W.

EPI 570 Occupational and Environmental Epidemiology (3) *Checkoway* Research methods for studying occupational and environmental determinants of disease. Defining exposed populations, characterizing exposure levels, estimating disease risks relative to exposure. Cohort, case-control, cross-sectional designs for various health outcomes. Applications to exposure standard setting and risk assessment. Prerequisite: EPI 511 or EPI 512, EPI 513 or permission of instructor. Offered: jointly with ENV H 570; Sp.

EPI 571 Neuroepidemiology and Environmental Risk Factors (3) *Kukull* Focus on neurological diseases and etiology. Presentation of descriptive epidemiology, clinical features, and risk factors, including stroke, Parkinson's disease, Alzheimer's disease, multiple sclerosis, and other disorders. Discussion of NIH grantsmanship. Guest experts present some topics. Recommended: EPI 511 or equivalent. Offered: jointly with ENV H 571; odd years; W.

EPI 573 Methods and Issues in Using Biological Measurements in Epidemiologic Research (3) *Schwartz* Introduction to use of measurements from biological specimens in epidemiologic studies. Prepares epidemiology and laboratory science students for conduct of interdisciplinary human studies. Evaluation of biomarkers, preliminary studies, methodologic issues, quality control. Brief review of molecular biology. Applications and current literature discussed. Prerequisite: EPI 511 or EPI 512. Offered: jointly with ENV H 573.

EPI 583 Epidemiology Seminar (1, max. 3) Presentation of current epidemiologic research and application of epidemiologic research in the practice of public health. Offered: AWSp.

EPI 585 Principles of Injury Research and Prevention (3) *Shiff* Focuses on broad concepts including a conceptual model, surveillance, research methods, control and prevention of injuries. Topics include unintentional injuries from motor vehicle crashes, falls, drowning, sports injuries and intentional injuries from youth violence, intimate partner violence, homicide and suicide. Recommended: EPI 511. Offered: A.

EPI 588 Preparing and Writing Research Proposals (2) *Kristal, Reiber* Experience in preparing, organizing, and writing research proposals, following NIH and AHRQ guidelines. Includes weekly assignments and didactic exercises, leading to final research proposal. All students participate in mock study section to review and critique proposals. Credit/no credit only. Prerequisite: second-year graduate student (PhD recommended), or PhD or MD in health-related field. Offered: odd years; A.

EPI 589 Epidemiologic Research in Aging Populations (3) *LaCroix* Emphasizes application of epidemiologic methods to the study of older populations. Topics include: compression of morbidity; successful aging; methodological challenges in studying older populations; physical, cognitive and social function as epidemiological endpoints; chronic conditions of the aging (heart disease, cancer, Alzheimer's disease, dementia, osteoporosis, fractures); health promotion strategies. Prerequisite: EPI 511 or EPI 513. Offered: jointly with HSERV 589.

EPI 590 Selected Topics in Epidemiology or International Health (1-6, max. 6) Tutorials are arranged for a small number of students for in-depth examination of an area of epidemiology or international health, usually of current nature. Seminar format. Prerequisite: EPI 511. Also a special summer format presenting introductory material. May be offered with ENV H 590 and/or HSERV 590. For more information and permission, consult the department program adviser. Offered: AWSpS.

EPI 591 Current Literature in Epidemiology (1) Articles pertaining to epidemiology and related subjects selected from the current literature to be distributed and read by all participants. Faculty members and enrolled students alternate being responsible for conducting sessions and choosing articles to read. Credit/no credit only. Prerequisite: EPI 513. Offered: AWSp.

EPI 592 Program Seminars (1-6, max. 6) Graduate seminars organized to address specific educational needs of students in various specialized programs within the Department of Epidemiology (i.e., Maternal and Child Health). Prerequisite: permission of instructor. Offered: AWSpS.

EPI 593 Cancer Prevention Research Laboratory (3) *White* Research experience for pre- and postdoctoral students working on cancer prevention projects at the Fred Hutchinson Cancer Research Center. Credit/no credit only. Offered: jointly with BOST 593; AWSpS.

EPI 595 Epidemiology Master's Practicum (1-6, max. 6) Supervised practice experience providing students an opportunity to learn how epidemiology is applied in a public health setting and in the formulation and application of public health policy. Credit/no credit only. Prerequisite: EPI 512 and BOST 511 or equivalent and permission of instructor. Offered: AWSpS.

EPI 600 Independent Study or Research (*) Credit/no credit only. Prerequisite: permission of departmental adviser and independent study supervisor. Offered: AWSpS.

EPI 700 Master's Thesis (*) Credit/no credit only. Prerequisite: permission of thesis chair. Offered: AWSpS.

EPI 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of dissertation chair. Offered: AWSpS.

Public Health Genetics

PHG 509 Multidisciplinary Communication in Public Health Genetics (2) *Watts* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with HSERV 509.

PHG 510 Genetic Principles for Public Health (3) *Austin, Doyle, Leboeuf* Basic principles of human genetics in a public health context; the molecular components of life, organization of the genome, gene expression, recombinant DNA technology, gene regulation, Mendelian inheritance, quantitative genetics, nutrition and gene expression, mitochondrial inheritance, gene mapping, gene-environment interactions, Human Genome Project, and genetic service in public health.

PHG 511 Genetic Epidemiology (3) *Austin, Edwards* Research methods for evaluating genetic influences on disease and risk factors and genetic-environmental interactions. Study designs and statistical methods include twin studies, family studies, population-based association studies, segregation analysis, and linkage analysis. Prerequisite: EPI 511, BOST 511, and GENET 371, or equivalent. Offered: jointly with EPI 517.

PHG 512 Legal, Ethical, and Social Issues in Public Health Genetics (3) *Kuszler, Mastroianni* Equips the student to anticipate and assess potential legal, ethical, and social barriers complicating the incursion of new genetic advances, information, and technologies into public and private health care delivery efforts. Prerequisite: GENET 371 or equivalent. Offered: jointly with LAW H 504/MHE 514.

PHG 513 Basic Concepts in Pharmacogenetics and Toxicogenomics (3) *Eaton, Thummel* Addresses current DNA sequencing and genotyping approaches, and basic concepts of pharmacogenetics and toxicogenomics. Emphasis placed on applications of genomic

technologies to the understanding of “gene-environment interactions” that cause diseases of public health importance, including cancer, chronic neurological diseases, and adverse drug reactions. Prerequisite: GENET 372 or equivalent. Offered: jointly with ENV H 513/PCEUT 513.

PHG 518 Computer Demonstrations in Genetic Epidemiology (2-4, max. 4) *Edwards* Demonstrations and use of computer programs designed specifically for analysis of genetic epidemiologic data, including heritability, segregation, and sib-pair linkage analysis. Discussions focus on interpretation of results. Laboratory sections apply methods to data provided by instructor. Corequisite: EPI 517/PHG 511 or permission of instructor. Offered: jointly with EPI 518.

PHG 519 Statistical Methods in Genetic Epidemiology (3) Theory and application of statistical techniques used in genetic epidemiology. Includes discussion of association studies, linkages and segregation analyses. Examples stressed with reference to assumptions and limitations. Prerequisite: either BOST 513 or BOST 518; PHG 511/EPI 517; or permission of instructor. Offered: jointly with BOST/EPI 516.

PHG 521 Socio-Cultural Perspectives of Public Health Genetics (3) *McGrath* Examines social and cultural issues of human genome sequencing and control of genetic expression. Attitudes and behaviors toward health, illness, and disability are studied using historical, contemporary, and cross-cultural case study material. Offered: jointly with NURS 582/ANTH 574.

PHG 522 Ethical Frameworks for Public Health Genetics (2) *Mastroianni* Case-based application of ethical principles in genetic medicine to range of problems arising in genetics practice, policy, research. Examination of traditional problems including eugenics and testing/screening for genetic disease, as well as emerging problems in population and environmental genetics. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with MHE 516.

PHG 523 Genetics and the Law (2) *Kuszler* Considers the legal issues arising from new genetic technologies and information. Statutes, regulations, and cases used to demonstrate the constitutional, contract, and tort law complications resulting from dissemination of these technological advances. Prerequisite: LAW E 562/MHE 514/PHG 512 or permission of instructor. Offered: jointly with LAW H 520.

PHG 525 Public Commentary on Ethical Issues in Health Genetics (3) Explores issues in public health genetics through academic commentary, personal narratives, science fiction, and film using ethical frameworks from narrative ethics, feminist ethics, and principlism. Includes cloning, assisted reproduction, prenatal genetic testing presymptomatic genetic testing, gene therapies, scientific responsibility, and GMOs. Graduate students only. Offered: jointly with MHE 515.

PHG 532 Statistical Methods in Medical Genetics (2) *Wijsman* Theory and application of statistical techniques used in medical genetics. In-depth discussion of linkage and segregation analysis and ascertainment problems. Applications with stressed with reference to assumptions and limitations. Data sets analyzed with current

computer programs. Offered: jointly with BOST/MED 532.

PHG 537 Pharmacoeconomics, Genetics, and Health Care (2) *Ramsey, Veenstra* Introduction to outcomes research and economic evaluation related to pharmaceuticals and genetic technologies. Covers cost-effective analysis and quality of life evaluation. Discusses the use of economic evaluation in healthcare to affect policy decisions.

PHG 541 Economic and Policy Issues for Genetic Technologies and Services (3) *Ramsey, Watts* Introduction to economic evaluation in healthcare. Students learn and apply economic principles to the political and policy issues surrounding genetic technologies and services. Focus on formulation of facts and policy alternatives in several areas of public controversy with regard to genetic testing and treatment.

PHG 542 Genetic Discovery in Medicine and Public Health (3) *Burke* Addresses the clinical and societal implications of genetic knowledge, with an emphasis on the ethical and policy issues surrounding the use of genetic technology in medicine and public health from 1900 to the present. Offered: jointly with MHE 530; W.

PHG 543 Social and Behavioral Research Methods in Public Health Genetics (3) *Bowen, McGrath* Provides an overview of social and behavioral research and theory used in the study of public health genetics. Examples are from a range of disciplines, using a variety of methodologies. Prerequisite: graduate standing in Public Health Genetics, or permission of instructor.

PHG 580 Interactive Seminar (1, max. 6) *Veenstra* Seminar series on topics related to public health genetics, including current bioethical, legal, medical, biotechnology, and public policy issues.

PHG 581 Introduction to Bioinformatics and Genetics Services in Public Health Genetics (1) *Austin, Doyle, Rose* Introduction to bioinformatics computer skills and genetic services related to public health genetics. Credit/no credit only.

PHG 590 Selected Topics in Public Health Genetics (1-6, max. 6) Tutorials are arranged for a small number of students for in-depth examination of an area of public health genetics, usually of a current nature.

PHG 595 Master's Practicum (1-12, max. 12) Supervised practice experience providing students an opportunity to learn how genetics is applied in a public health setting and in the formulation and application of public health policy. Prerequisite: EPI 517/PHG 511, LAW E 562/MHE 514/PHG 512, ENV H/PABIO/PCEUT/PHG 513, or permission of instructor.

PHG 600 Independent Study or Research (*) Credit/no credit only. .

PHG 700 Master's Thesis (*) Credit/no credit only.

PHG 800 Doctoral Dissertation (*) Credit/no credit only.

Health Services

Health Information Administration

HIA 409 Disease Concepts for Managers (4) Develops a methodology for understanding and communicating dimensions of disease states as all health state that a person might experience. Presents clear, effective ways to describe the diversity of health conditions and focuses on disease from a health information systems perspective. Offered: S.

HIA 410 Introduction to Health Care Systems and Health Data Systems (6) Covers current issues in health care; accreditation, licensure and professional standards; health records analysis, statistics, data linkage, application of professional standards to health records and record management systems; retrieval, tracking and retention systems.

HIA 412 Healthcare Coding, Vocabulary and Revenue Cycle Management (5) Overview of clinical vocabularies and classifications, detailed instruction on International Classification of Diseases, ninth revision, clinical modification (ICD-9-CM) and Current Procedural Terminology (CPT) coding principles, and revenue cycle management. Prerequisite: HIA 409.

HIA 420 Health Care Computer Systems and Electronic Health Records (5) Current health information systems and the role of health informatics; technology infrastructure and health informatics standards, electronic health records, definitions, functions, issues, and barriers; hospitals, ambulatory care, home health and long-term care and computer applications. Prerequisite: HIA 410; HIA 411.

HIA 421 Health Information Systems Analysis (5) Examines lifestyle systems development process, project management, analysis of health information systems, and user requirements. Prerequisite: HIA 420.

HIA 450 Organizational Theory in Health Facilities and Healthcare Delivery (3) Addresses the organization of healthcare services across the spectrum of healthcare delivery systems – both governmental (federal, state, local) and private. Financing of healthcare services and related policy issues are explored.

HIA 460 Management Project I (3) Explores the development of management skills and competencies.

HIA 462 Management Project II (3) Explores applied management using a formal project. Prerequisite: HIA 460.

HIA 470 Legal Concepts for Health Fields (3) Examines principles of law as applied to the health field, with reference to health information management.

HIA 480 Management, Problem-Solving and Decision-Making (4) Provides the tools and experiences useful at a management level for problem-solving and decision-making in health information administration.

HIA 499 Independent Study (2-5) .

Health Services

HSERV 475 Perspectives in Medical

Anthropology (5) *Rhodes* Introduction to medical anthropology. Explores the relationship among culture, society, and medicine. Examples from Western medicine as well as from other medical systems, incorporating both interpretive and critical approaches. Offered: jointly with ANTH 475.

HSERV 480 Issues in Public Health (1-3, max. 6) *Bezruchka, Sappington, Wing* Problems and issues in epidemiology, health services delivery and administration, environmental health, pathobiology, biostatistics, and related fields.

HSERV 481 Issues in Public Health (2)

Bekemeier Introduction to public health taking an in depth look at local public health practice. Focuses on practical solutions for real life problems in local public health settings. Uses modified problem-based learning (PBL) format. Framework is 10 Essential Public Health Services. Student groups prepare for and explore new issues. Offered: W.

HSERV 482 The Health of Populations (2)

Bezruchka Explores what makes a population health or unhealthy. Examines why the USA is less healthy than all the other rich countries, despite being one of the healthiest fifty years ago. Offered: Sp.

HSERV 490 Undergraduate Special Topics (1-6, max. 12)

Collect and analyze literature related to historical and current public health issues, problems and programs; analyze information and develop written summaries to demonstrate increased knowledge and competencies as applied to public health. Prerequisite: HSERV 480.

HSERV 499 Independent Study in Health

Services (1-12, max. 12) Individual library or field study project selected in consultation with a faculty adviser.

HSERV 501 Public Health Practice at the

Local Level (3) *Thompson* Basic overview of state and local public health practice with leaders in the field and case studies focusing on rural and urban public health challenges. Offers preparation for practice in public health agencies. Prerequisite: HSERV 511 or permission of instructor. Offered: jointly with EPI 501; Sp.

HSERV 503 Public Health Informatics and

Surveillance (3) Covers collection and use of public health surveillance data in formulating policy and managing programs through lectures and real-world interactive exercises. Discusses surveillance for birth defects, environmental exposures, and hospital-acquired infections, and use of tools such as small area analysis and geographic information systems. Offered: jointly with EPI 503.

HSERV 504 Health Communication ([1-3]-,

max. 3) *Downer* Overview of the theory and practice of designing, producing, and evaluating public health communication campaigns, including the use of mass media. Develops greater capacity for critical judgment about the use of communication strategies for achieving public health goals.

HSERV 505 Topics in Preventive Medicine (2)

Goldbaum Examines current scientific knowledge and state of the art of preventive medical interventions. Discusses and considers options

for current practice. Recommended for MDs, RNs, and others with a clinical background. Credit/no credit only. Offered: jointly with EPI 525.

HSERV 507 Communication for Health

Promotion: Theory and Application (3) *Meischke* Discuss and evaluate health communications theories and applications at the individual level (i.e., persuasion), interpersonal level (i.e. doctor/patient communication), and societal level (i.e., mass media). Investigate intercultural communication cutting across all levels of health communication. Examines the steps involved in the design of a health communication intervention.

HSERV 508 Dynamics of Community Health

Practice (3-5, max. 5) *Chrisman* Examination of and experience with basic principles of clinical practice in community settings. Includes family as community constituent, populations at risk, community assessment, and community development. Prerequisite: Graduate standing or permission of course faculty. Offered: jointly with NURS 560.

HSERV 509 Multidisciplinary Communication

in Public Health Genetics (2) *Watts* Focuses on effective communication in a multi-disciplinary context. Students will read and critique published public health genetics literature, and learn and apply principles of effective written and oral communication to public health genetics topics of their choice. Credit/no credit only. Offered: jointly with PHG 509.

HSERV 510 Society and Health (3)

Spigner Analysis of social inequalities in health and service use by class, gender, and the social construction of race. Examines biological, cultural, social, political, and economic determinants which consistently put certain minority groups within Eurocentric societies at higher risk for inequitable health status and provision. Prerequisite: HSERV 511 or equivalent or permission of instructor.

HSERV 511 Introduction to Health Services

and Public Health (3-4) *Thompson* History, organization, and effectiveness of United States health care and public health systems. Determinants of health, need, and utilization. Public and private financing. Supply and provision of personal and public health services. Managed care. Government and private sector roles. Prerequisite: graduate standing or permission of instructor.

HSERV 512 U.S. Health and Health Care:

Organization, Financing, and Delivery (3) *Dowling, Wickizer* Students review and examine selected topics from literature. Includes: need and access to care; theory and effects of health insurance; private and public insurance programs; managed care; costs/expenditures; availability and organization of health resources; and quality assessment and improvement. Enrollment priority for Health Services PhD students. Prerequisite: HSERV 511. Offered: A.

HSERV 513 U.S. Health and Health Care:

Population Health, Social Determinants, and Health Disparities (3) *Patrick* Explores the elements and actions of a population health approach, including conceptualizing the determinants of health, synthesizing knowledge about major social determinants, and applying knowledge to improve population health and reduce health disparities. Enrollment priority for Health Services PhD students. Prerequisite:

HSERV 511, and permission of instructor; recommended: HSERV 512. Offered: W.

HSERV 514 U.S. Health and Health Care:

Health Policy Research (3) *Lafferty* Extends students' understanding of the nature of health policy and health policy development in the context of a market-based economy. Enrollment priority for Health Services PhD students. Prerequisite: HSERV 511, and permission of instructor; recommended: HSERV 512/513. Offered: Sp.

HSERV 516 Introduction to Health Services —

Extended Degree(4) *Wickizer* Provides overview of health care system, exposes students to current issues and developments affecting organization and delivery of health services, helps students develop ability to frame and analyze questions and issues related to health services. Prerequisite: registration in Extended Degree program. Offered: A.

HSERV 517 Provision of Health Services —

Extended Degree (2) *Baesler* Builds on material covered in 516 and provides students with tools used to evaluate alternative health delivery systems; exposes students to various international health delivery systems; encourages students to decide how to organize such a system. Prerequisite: HSERV 516, registration in Extended M.P.H. Degree program. Offered: W.

HSERV 518 Social and Ethical Issues (2-4,

max. 4) *Mastroianni* Presents introduction to ethical issues in public health policy and practice. Additional one credit option focuses on health administration/managed care. Coursework designed to train students in basic skills of ethical analysis and increase competency in recognizing, researching, and analyzing issues arising in public health and health services delivery.

HSERV 520 Methods in Applied Community

Research ([1-3]-, max 3) *Astley* Skills/knowledge necessary to conduct orderly investigation of specific problems in preparation for M.P.H. thesis or project. Includes problem identification, posing research questions, literature review, consideration of theoretical/practical context, choosing study design, data collection, protection of human subjects, and recognizing potential errors. Credit/no credit only. Prerequisite: registration in Extended M.P.H. Degree program.

HSERV 522 Health Program Evaluation ([1-4]-,

max. 4) *Grembowski* Politics, theory, methods of evaluation, from simple health programs to evaluation of large-scale interventions. Emphasizes experimental and quasi-experimental designs to estimate program impacts, as well as evaluation of program implementation. Case studies drawn from health field illustrate various types of evaluations. Prerequisite: background in introductory statistics.

HSERV 523 Advanced Health Services

Research Methods I (4) *Diehr, Maciejewski* Examines how to apply research methods and addresses recurring issues in health services research. Covers statistical theory that motivates the methods and empirical work that demonstrates a method's use. Enrollment priority for Health Services PhD students. Prerequisite: either HSERV 511, BIOST 511/512/513, BIOST 517/518, or EPI 511/512, and permission of instructor. Offered: A.

HSERV 524 Advanced Health Services

Research Methods II (4) *Zimmerman*

Emphasizes the application of advanced biostatistical/econometric techniques in applied research. Examines a wide variety of posed research questions and demonstrates how to best obtain answers. Enrollment priority for Health Services PhD students. Prerequisite: either HSERV 511, BOST 511/512/513, BOST 517/518, or EPI 511/512, and permission of instructor. Offered: W.

HSERV 525 Advanced Health Services Research Methods III (4) *Sales* Introduction to methods of handling data and conducting basic analyses in the broad and heterogeneous field of health services research. Examine concepts and conduct hands-on research using large, public use data. Enrollment priority for Health Services PhD students. Prerequisite: either HSERV 511, BOST 511/512/513, BOST 517/518, or EPI 511/512, and permission of instructor. Offered: Sp.

HSERV 527 Survey Research Methods (4) *Martin* Provides students with skills in questionnaire development and survey methods. Develop a questionnaire and design a survey research proposal on a health-related or social topic. Prerequisite: either HSERV 511-513; BOST 517-518; or EPI 512-513, which may be taken concurrently or permission of instructor is required, and students should have a survey project in mind. Offered: jointly with CS&SS 527.

HSERV 526 Qualitative Research Methods for Public Health (4) *Bezruchka* Covers a range of qualitative, ethnographic tools for practical applications in public health. Methods covered include direct observation, informant interviews, focus groups, and formal methods. Covers Rapid Assessment Procedures and Participatory Action Research. Student teams investigate research questions using these techniques. Offered: Sp.

HSERV 528 Critically Appraising and Applying Evidence in Health Care (3) *Pinsky, Wolf* Literature appraisal skills for various articles (therapy effectiveness, diagnostic tests, literature reviews, clinical measurement, prognosis, quality of care, decision analysis, causation/etiology, guidelines, and economic evaluation). Appraisal of clinical information from literature, strengths/weaknesses of data, analyses, study design/applicability to a current patient's problem. Prerequisite: permission of instructor. Offered: jointly with MEDED 540; W.

HSERV 529 Introduction to Systematic Reviews and Meta-analysis of Evidence (2) *Wolf* Conceptual understanding of the quantitative methods used to synthesize evidence. Methods for pooling evidence across independent studies, pooling binary/continuous outcomes, differences between fixed and random effects models, and guidelines for appraising published systematic reviews/meta-analyses. Prerequisite: introductory-level courses in statistics, epidemiology, or biostatistics. Offered: jointly with MEDED 541; Sp.

HSERV 531 Problems in International Health (4) *Gloyd* Explores social, political, economic, environmental determinants of developing countries' health; traces development of societal responses to problems. Includes: origins of primary health care; child survival; traditional systems; population; water; sanitation; international agencies; impact of economic policies. Case study formulating pharmaceutical policy in a developing country. Offered: jointly with EPI 531; A.

HSERV 532 International Health-Introduction and Topics (4-, max. 8) Encourages students to demonstrate their facility with concepts and readings by creating short essays on selected topics. Overview emphasizing assessment, assurance, policy development, and the future of global health.

HSERV 533 Population, Health, and Development (2) *Povey* Provides students with an introduction to demographic conditions in Third World countries and an understanding of the consequences of rapid population growth on health and the environment. The context and effectiveness of family planning programs is a major focus.

HSERV 534 Global Population Health and Development (3) *Bezruchka* Looks at determinants of population health in different countries, to learn about the constraints of typical public health and development paradigms. Topics include colonialism, development and underdevelopment, political economy, culture, health behaviors, hierarchy, health care and medical harm. Prerequisite: experience working in a health program.

HSERV 536 Emerging Infections of International Public Health Importance (3-, max. 3) *Kimball* Overview of current emerging infections worldwide and contributing factors. Design of a surveillance and prevention strategy required. Offered: jointly with EPI 529; in residence, odd years; online, even years; W.

HSERV 537 Economic Development and Health (1, max. 3) *Gish* Discusses issues of broad interest in the areas of economics, development, and health. Credit/no credit only. Offered: AWPSP.

HSERV 539 Research Methods in Developing Countries (3/4) *Gloyd, Mock* Simple, practical methodologies to obtain and validate information regarding health status and health services in developing countries. Usefulness, validity, limitation of vital records, health reports, household (and cluster) surveys, nutritional anthropometry, and qualitative methods discussed. Lectures, computer lab, and student participation in community-based survey. Offered: jointly with EPI 539; W.

HSERV 540 Nutrition in Developing Countries (3) *Bruemmer, Gorstein* Introduces issues of nutrition in developing countries, with an emphasis on the control and prevention of under nutrition and micronutrient deficiencies. Offered: jointly with NUTR 555; Sp.

HSERV 541 Topics in Maternal and Child Health I (3-, max. 3) *Bell* Historic, legislative, organizational, and financial basis of health and social services for families and children in United States. Effects of changing family structure and norms; factors affecting health care needs of specific populations, including racially and ethnically diverse groups; impact of policies/programs on health and well-being of families and children.

HSERV 542 Epidemiology of Maternal and Child Health Problems (3-4]-, max. 4) *Emanuel, Williams* Contributions to understanding and prevention of major maternal and child health problems, including pregnancy outcome, infant and child morbidity and mortality, maternal morbidity and mortality, abnormal child growth and development, and early-life factors in adult health problems. Prerequisite: graduate, medical,

or dental school standing and 511 or 512 or permission of instructor. Offered: jointly with EPI 521.

HSERV 543 Topics in Maternal and Child Health III (3) *Huebner* Provides an overview of contextually based frameworks for understanding growth and development. Identifies and describes the conceptual basis and theory of change that underlie successful preventive intervention efforts to promote the well being of children and reduce common MCH problems.

HSERV 544 Maternal and Child Health in Developing Countries (3) *Mercer* Emphasizes critical health problems of women and children in developing countries in social, economic, and cultural contexts. Practical approaches to developing MCH programs shared via lecture/discussions, exercises, and small group work. Students acquire skills in baseline assessment, setting objectives, planning and evaluating interventions, and involving communities. Offered: jointly with EPI 544; Sp.

HSERV 548 Social Determinants of Health Research Methods (3) *Beresford, Smith* Explores study design, measurement and analytic issues applicable to research into the social determinants of health. Semi-weekly graduate-level seminar offered to students with a basic knowledge of epidemiological and biostatistical principles. Prerequisite: either EPI 511 or EPI 512/EPI 513; BOST 511/BOST 512 or BOST 517/BOST 518. Offered: jointly with EPI 548; W.

HSERV 550 Policy and Economics: Fundamentals and Applications (3) *Katz, Watts* Explores how values drive the structure of societies, economic systems, public policies, and ultimately, allocation and distribution of resources. Explores how science and community values intertwine in the development of health policy, and how ideology, culture, and history influence structure and change a nation's health system. Offered: W.

HSERV 551 Health Law (2) Analysis of law, the legal system and current legal problems as they relate to the financing and delivery of health care services. Offered: Sp.

HSERV 552 Health Policy Development (3-, max. 3) *Katz, Watts* Focuses on development of public policy concerning medical care and public health and the relationship between public decisions and the market place. Using contemporary policy issues as case studies, examines the role science, ideology, culture, and history play in influencing the structure of and changes to a nation's health system.

HSERV 553 Politics of Health Care (3) *Hagens* Understanding of health policy making within the context of American politics. Health policy making is examined in light of political leadership, the legislature, the initiative process, rule making, interest groups, and lobbying. Prerequisite: HSERV 551, a basic understanding of the American health care system, or permission of instructor.

HSERV 554 Health Legislation Seminar (1) *Beyer, Seib* Discussion of current state of health policy, topics with legislative staff and others involved with state health policy. In addition to four sessions on campus, course meets once in Olympia during legislative session. Credit/no credit only.

HSERV 560 Adult Learning: Theory and Practice (3) *Downer* Designed to help students apply Popular Education theory and practice to preparation, presentation, and evaluation of health education. Students design, teach, and evaluate four separate teaching sessions (one between each seminar) using theory and principles of Popular Education learned to date. Prerequisite: graduate standing or permission of instructor.

HSERV 561 Introduction to Health Promotion and Planning (3) *Downer* Overview of behavior change theory and comprehensive approach to planning, implementing, and evaluating health promotion interventions. Links theory to practice. Uses PRECEDE/PROCEED planning model by Green and Kreuter as framework. .

HSERV 570 Seminar on Issues in Social Medicine (3) *Rhodes* Qualitative research organized around selected works in sociology, anthropology, and public health. Readings and discussion of literature, individual class presentations. Addresses fellowship programs and student research projects.

HSERV 571 Cultural Competency for Public Health Practice (1-4, max. 4) *Thornton* Application of cultural competency to clinical practice, health care management, and health services research when working with culturally diverse populations. Methodological orientation is qualitative, historical, and ethnographic. Lecture, narratives, discussions, guest presentations, film, video. Interdisciplinary perspective appropriate for graduate students in public health, health administration, nursing, social work, and anthropology. Offered: Sp.

HSERV 572 Community Development for Health (4) *Hagopian, House* Learn the literature, theory, history, and accepted knowledge in the fields of community development, activism, and community organizing within a health systems context. Provides a forum for exploring approaches to community development and organizing. Gain specific skills and master techniques. Offered: W.

HSERV 573 Community Development for Health Seminar (1) Explores the importance of community as a determinant of health, and how public health workers can help strengthen communities. Companion course to HSERV 572. Meets Friday afternoons to hear community organizers and leaders in community development.

HSERV 574 Seminar in Biobehavioral Interventions, Communications, and Cancer Outcomes I (3) An intensive, case-focused review of methods for conducting research in cancer prevention and control, covering areas related to epidemiology, genetic epidemiology, clinical trials, and translational research as it applies to cancer. Includes faculty lectures, discussions of new proposals, and trainee presentations of research ideas.

HSERV 575 Cancer Prevention and Control (3) *Bowen* Provides an overview of research in cancer prevention and control for students training for a career in this field. Students identify major areas of prevention and control research, conduct an analysis of data in cancer prevention and control, and learn to prepare a research project grant. Prerequisite: permission of instructor.

HSERV 576 Health, Culture, and Community (3) A theory and skills class concerning

development of personal and organizational cultural competence in community-based participatory research. Core concepts of cultural competence are considered as they are practiced in community settings. Fieldwork required. Offered: jointly with NURS 557.

HSERV 580 Society, Chronic Illness, and Disability (3) *Hedrick* Definition and assessment of chronic illness, disability, and health status. Analysis of chronic illness and disability using frameworks from social sciences and public health. Dimensions of disablement as they affect provision of health services. Research on effectiveness of services and approaches to improvement. Prerequisite: HSERV 511 or permission of instructor.

HSERV 581 Strategies of Health Promotion (4) *Bowen, Drewnoski* Assessment of health promotion planning, implementation, and evaluation strategies for their strengths, weaknesses, and effectiveness. Students critique strategies to modify behavioral factors that influence lifestyles of individuals, including decisions influencing their reciprocal relationship with environmental factors affecting the health of individuals, organizations, and communities. Offered: jointly with NUTR 581. Prerequisite: HSERV 511.

HSERV 582 Theoretical Perspectives on Health Behavior Change ([3-4, max. 4]-) *Meischke* Overview of theoretical perspectives in health behavior at the individual, interpersonal, and community level. Focuses on increasing skills in describing, applying, and integrating these frameworks in the design and evaluation of health promotion interventions. Prerequisite: HSERV 511 or permission of instructor.

HSERV 583 Economic Evaluation in Health and Medicine (3) *Sullivan, Veenstra* Methods and techniques for evaluating costs and cost-effectiveness of health, medical, and pharmaceutical interventions. Emphasis on economic evaluation, decision analysis, and modeling techniques for resource allocation and decision making. Applications to technology assessment, health policy, clinical practice, and resource allocation. Prerequisite: permission of instructor. Offered: jointly with PHARM 534; A.

HSERV 584 Evaluating Cost and Outcomes in Health and Medicine 2 (3) *Patrick, Sullivan, Veenstra* Concepts and methods for evaluating cost and outcomes of health and medical interventions with a focus on cost-effectiveness analysis., pharmacoeconomics, health and quality of life assessment, resource allocation, and medical decision-making. Prerequisite: permission of instructor. Offered: jointly with PHARM 535.

HSERV 585 Seminar in Medical Geography (5, max. 10) Intensive research seminar dealing with new and promising research themes in medical geography and public health. Offered: jointly with GEOG 581; A.

HSERV 586 Medical Geography (3) *Mayer* Geography of disease, consideration to health systems planning. Distributions, diffusion models, migration studies. Application of distance, optimal location models to health systems planning; emergency medical services, distribution of health professionals; cultural variations in health behavior. Prerequisite: familiarity with social science research, health-related issues. Offered: jointly with GEOG 580.

HSERV 587 Health Policy Economics (3) *Watts* Applies economic theory to selected topics in health care, including information, risk and insurance, industry organization, government regulation, and public health issues. Emphasizes policy implications of these applications.

HSERV 588 Community Approaches to Health Promotion (3) *Thompson* Provides opportunities to critically examine community-based health promotion interventions and the design, evaluation, and implementation issues they raise. A wide range of disciplinary perspectives is presented. Case studies and class projects are designed to give students the skills needed to critically assess community projects around health promotion.

HSERV 589 Epidemiologic Research in Aging Populations (3) *LaCroix* Emphasizes application of epidemiologic methods to the study of older populations. Topics include: compression of morbidity; successful aging; methodological challenges in studying older populations; physical, cognitive and social function as epidemiological endpoints; chronic conditions of the aging (heart disease, cancer, Alzheimer's disease, dementia, osteoporosis, fractures); health promotion strategies. Prerequisite: EPI 511 or EPI 513. Offered: jointly with EPI 589.

HSERV 590 Selected Topics in Health Services (*-) By individual arrangement, the student and faculty member(s) develop a program of reading and conference appropriate to the topic selected by the student. The topic chosen will be within the special competence of the faculty participating in the course, in the areas of health-care delivery and health-care administration. Also special summer format presenting introductory material may be taken with ENV H 590 and/or EPI 590. For more information and permission, consult department program adviser.

HSERV 591 Community Oriented Public Health Practice (1-6, max. 42) Seven-quarter integrated sequence covers public health aspects of community assessment, biostatistics, epidemiology, health promotion/disease prevention, behavior change, environmental health, community development, policy development and analysis, and program planning and management. It is taught in a problem-based format. Prerequisite: enrollment in the COPHP program.

HSERV 592 Program Seminars (1-6, max. 6) Graduate seminars organized to address specific educational needs of students in various fellowships, residencies, and other specialized programs within the Department of Health Sciences (i.e., maternal and child health, international health, preventive medicine, social and behavioral sciences). Prerequisite: permission of instructor.

HSERV 595 Practicum/Field Work in Community Medicine (1-12-, max. 12) Experience in variable time blocks in community health activities in agencies delivering and planning health services. Sites include neighborhood clinics, health planning bodies, medical practice settings, public health agencies, special problem clinics and facilities, environmental programs and services. Prerequisite: master's student in health services and permission of instructor.

HSERV 598 Extended Degree Program Project Option (*, max. 9) Supervised project work on a

selected topic related to student's concentration in graduate study. Includes survey of literature, development of approach, and written paper on conclusions. Prerequisite: registration in extended MPH degree program and satisfactory completion of the first summer's course work.

HSERV 600 Independent Study or Research (*) Prerequisite: permission of instructor.

HSERV 700 Master's Thesis (*) Prerequisite: permission of instructor.

HSERV 800 Doctoral Dissertation (*).

Health Services Management

HSMGMT 501 Epidemiology/Critical Evidence Appraisal (3-4) *Kopjar* Basic knowledge about methods used in epidemiology and their application to critical appraisal of clinical, epidemiological, and health administration literature for evidence-based management of healthcare organizations, improvement of delivery of health services, and for creating health policies. Offered: W.

HSMGMT 502 Evidence-Based Health Care Planning (3-4) *Kopjar, Richardson* Applies the techniques of statistics, epidemiology, and critical evidence appraisal to the design and evaluation of population-based health care programs. It is the third course in a three-course sequence. Offered: Sp.

HSMGMT 512 Introduction to Management in Health Services (3) *Dowling* Overview of managerial roles, such as supervising and motivating, approaches to organizational and environmental assessment and change, and development of systems analysis skills. For students pursuing careers in research and teaching who are likely to have management responsibilities.

HSMGMT 513 Seminar in Healthcare Finance(4) *Conrad* Focuses on case studies and modern theory in managerial finance relevant to health services. Students prepare group presentations and individual case study analyses of health services finance problems. Builds on accounting and finance principles ACCTG 503 and HSMGMT 571, or the equivalent, are recommended prerequisites, but not required. Offered: Sp.

HSMGMT 514 Health Economics (3/4) *Wickizer* Uses economic concepts and tools to examine range of issues pertaining to health care, delivery of health care services. Includes demand analysis, production of health services, expenditure growth, markets for hospital and physician services, externalities. Emphasis on using economics to examine issues and solve problems. Prior economics courses not required. Offered: W.

HSMGMT 522 Applied Data Analysis (3) *Cheadle, Connell* Practical experience in quantitative research, using a data set of their choosing to formulate a research question, clean and edit the data, and do the analysis. For second-year students in the School of Public Health who plan to do quantitative analysis for the their thesis or project. Credit/no credit only. Offered: W.

HSMGMT 523 Informatics in Health Care Management (3) *Masuda* Medical informatics concerns the representation, organization, and manipulation of biomedical information and

knowledge. Exposes students to a high-level understanding of informatics and its health care applications. Discussion of successes and failures in implementing information technology focuses on gaining leadership and management knowledge that embraces informatics. Offered: W.

HSMGMT 543 Social and Behavioral Strategies for Improving Health (3) *Sloma* Explores social dimensions of health and medical care. Learn to identify key social and cultural principles that guide appropriateness in health care. Introduced to tools used to influence social expectations and personal behavior in relation to illness, health, and demand for medical treatments. Offered: S.

HSMGMT 545 Capstone Integrative Seminar (4) *Scott* Designed to assist students in the transition from theory to practice. Emphasis on sharpening analytical and intuitive leadership practices through the use of interactive case studies and team building exercises and field projects. Prerequisite: second-year MHA students. Offered: Sp.

HSMGMT 546 Long-Term Care (3) *Hawley* Learning experience for graduate students in health services administration, planning, other graduate students to increase their ability to identify and solve problems related to long-term care they confront in their employment. Students are exposed to available knowledge in the field; effective problem-solving attitudes and techniques for organizing information and/or developing strategies, and agencies in the field. Prerequisite: HSERV 511 or permission of instructor.

HSMGMT 560 Management Practice in Health Care and Public Health Organizations (1-3,max. 3) *Richardson, Sappington* Introduction to leadership and management, focusing on effective strategies for creating a productive work environment. Organizational structure and strategy introduced. Case studies and other problem-solving methods, using health services applications are utilized in order to apply theoretical material. Prerequisite: graduate student. Offered: Sp.

HSMGMT 561 Health Planning: The Management of Change (3-4) *Erbstoesser* Designing realistic implementation strategies at beginning of planning process to optimize impact of planning on real problems. Discussion of ways in which change is brought about and decisions are made and implemented. Includes managing planning process, work plans, stakeholders, negotiation, and working with groups. Prerequisite: HSERV 511 or permission of instructor. Offered: A.

HSMGMT 562 Strategic Management of Health Care Organizations (3-4, max. 4) *Dowling* Management of goals, strategy, and structure in health care organizations. Design of external relationships and internal structures., strategy-formulation, decision-making, and change. Integration of professional, social, and organizational values. Theory, student and practitioner experience, and case studies used to enhance repertoire of management approaches and skills. Prerequisite: HSERV 511 and HSMGMT 560 or equivalent.

HSMGMT 563 Personnel Management for Health Professionals (3) *Kienast* Designed for midcareer health services professionals developing strategies and skills in human

resource management. Focuses on policy and practice issues important to handling day-to-day personnel problems-selection, promotion, performance appraisal, discipline, grievances. Prerequisite: registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

HSMGMT 565 Quantitative Decision Making for Health Services Management (3) *Pilcher* Applications of various quantitative techniques for problem solving, monitoring, controlling, decision making in health services. Identifying problem area, communications with consultant, evaluation to the quality and applicability of analyst's work. Statistical, mathematical, operations research, industrial engineering techniques. Prerequisite: QMETH 500 or BIOST 509 or permission of instructor.

HSMGMT 566 Decision Support Models for Health Services (3) *Pilcher* Management science and approaches developed as applied to problems in public health. Emphasizes conceptual understanding of processes/application of systematic, and rational approach to managerial problem solving, including cost-benefit, cost effectiveness analysis. Prerequisite: BIOST 502 and 503, or BIOST 511; registration in Extended M.P.H. Degree program; non-business majors.

HSMGMT 571 Health Care Financial Management (4) *Conrad, Stillman* Third course in a three-course sequence dealing with the management of health services institutions and programs. Topics covered are: health services law, hospital and program policy decisions, financial planning, and hospital design and architecture; and the presentation of hospital survey and health services research project reports. Prerequisite: HSERV 511 and ACCTG 500 or ACCTG 501 or permission of instructor.

HSMGMT 572 Financial Management for Health Professionals (3) Intensive review of basic accounting principles/terminology and an introduction to financial management/managerial accounting, including budgeting for managerial control, planning, cost accounting, financing health programs. Managerial accounting, program costing, rate setting, budget preparation. Prerequisite: BIOST 502 and BIOST 503, or BIOST 511; registration in Extended M.P.H. Degree program or permission of instructor; non-business majors.

HSMGMT 573 Seminar in Health-Care Finance (3) *Pinsky, Wolf* Practical applications of corporate finance principles. Applies theoretical framework to health-care financial problems, including capital investment analysis, leasing vs. borrow-to-buy, debt capacity analysis, bond refunding, control of capital, joint venture. Prerequisite: either HSMGMT 514, HSMGMT 587; ECON 400, or ECON 500; ACCTG 503 (or equivalent); HSMGMT 571; or permission of instructor.

HSMGMT 574 Financial Management I (3-4) *Stillman* Prepares clinical professionals for participating intelligently in, and contributing to, financial decisions of health care organizations. Learn the language and fundamental concepts of accounting and finance, and become comfortable with what is required in formal financial analysis. Offered: A.

HSMGMT 575 Financial Management II (4) *Conrad, Stillman* Second in a two part series, the emphasis of this financial management course is

on preparing medical executives for managerial and leadership roles in health care organizations. Focus is on tools and analytic frameworks that health care managers use to make forward-looking decisions, including capital budgeting and risk analysis. Offered: W.

HSMGMT 590 Select Topics (1-6, max. 12) By arrangement, students and faculty members develop a program of reading and conference appropriate to the selected topic. The topic chosen is within the special competence of the faculty member participating in the course in the area of health services management.

HSMGMT 592 Health Management Program Seminar (1-6, max. 6).

Pathobiology

PABIO 201 Newly Emerging Diseases in Public Health (2) *NW Kenny* Newly recognized and emerging disease pose a major problem for public health. AIDS, hantavirus infections, Ebola virus infections, and the role of bacterial infection in the causation of stomach ulcers are examples of problems to be studied. Other timely diseases are presented in this lecture discussion course. Offered: A.

PABIO 301 Prevention of Infectious Diseases (3) *NW Kenny* Consideration of means of prevention of major classes of infectious diseases from the public-health view point. Classes of diseases are defined by site of infection (e.g. respiratory) or common mechanisms of spreading. Respiratory, sexually transmitted, water-borne, and tropical diseases. Prerequisite: either MICROM 301 or BIOL 201. Offered: Sp.

UCONJ 420 Biological Safety Practices (1) *Kenny* See University Conjoint courses.

PABIO 498 Undergraduate Thesis (*) .

PABIO 499 Undergraduate Research (*) .

PABIO 500 Introduction to Pathobiology Research (3-9, max. 9) Rotation through research laboratory. Credit/no credit only.

PABIO 511 Pathobiological Frontiers (2) *Kenny* Molecular and immunological concepts of infectious and noninfectious diseases presented in format suitable for graduate students knowledgeable in health-related areas who are not in biology-oriented programs. Allergy, immune responses, nature of infectious agents, prevention of disease with emphasis on newly defined diseases and disease agents. Prerequisite: permission of instructor.

PABIO 525 Cell Surface Membrane in Cell Sociology and Immunology (2) *Carter, Hakomori* Structure and function of cell surface membranes in relation to development of various diseases, particularly infection, cancer, and

inflammation. Examines how specific cell surface molecules are targets of recognition by microbes, tumor cells, and recruited inflammatory cells. Prerequisite: BIOC 440, BIOC 441, BIOC 442, and permission of instructor. Offered: jointly with MICROM 525.

PABIO 536 Bioinformatics and Gene Sequence Analysis (3) *Rose* Nature and relevance of molecular sequence information, computer-based protein, and DNA sequence analysis, molecular sequence and genomic databases, and methods for database accession and interrogation. Prerequisite: background in molecular biology and permission of instructor. Offered: jointly with MEDED 536; ASp.

PABIO 540 Antibiotic Resistance Mechanisms and Their Impact on Public Health (3) *Roberts* Lectures covering resistance mechanisms against bacterial antibiotics, antiviral, antiparasitic, and cancer drugs. Topics also include the effects that resistant microorganisms have on therapy and cancer treatment and their impact on public health. Prerequisite: permission of instructor.

PABIO 548 Molecular and Cellular Parasitology (3) *Feagin* Molecular and cellular biology of parasites of health-related significance, emphasizing current research topics unique to parasites, particularly well-suited for study in parasites, and especially important to study in host-parasite systems. Prerequisite: familiarity with molecular and cellular biology and permission of instructor. Offered: even years; Sp.

PABIO 550 Diseases of Public Health Importance and Strategies for their Control (3) Public Health perspective of major disease of national and global importance. Discussion of origins, establishment, progression, and pathogenesis of diseases. Importance of immunological, intercellular and external factors, and strategies of disease prevention. Requires a grounding in cellular and molecular biology, microbiology, and immunology. Prerequisite: permission of instructor.

PABIO 551 Biochemistry and Genetics of Pathogens and Their Hosts (4) . Provides a strong foundation in biochemistry, molecular biology, and genetics for students interested in disease. Principles will be illustrated through examples focusing on pathogens, and infectious and non-infectious disease. Prerequisite: undergraduate level course work in molecular biology or biochemistry or permission of instructor.

PABIO 552 Cell Biology of Human Pathogens and Disease (4) Cell biology and immunology explored through diseases of public health importance with examples of pathogen interaction with host cell biology and immune systems, unique aspects of the cell biology of pathogens, perturbations of these systems in non-infectious diseases and design of therapeutics and vaccines to combat diseases of public

health importance. Prerequisite: undergraduate level coursework in biology or molecular biology or permission of instructor.

PABIO 553 Survival Skills for Scientific Research (2) *Lukehart, Parsons* Focuses on skills needed for scientific career: writing abstracts, curriculum vitae, research proposals; preparing for oral presentations; lab management skills; discussion of mentorship/trainee relationships; case-based discussions of various topics in ethics and scientific misconduct. Credit/no credit only. Offered: Sp.

PABIO 568 Molecular Epidemiology of Infectious Diseases (2) Application of molecular typing techniques to study of microbial pathogens to increase understanding of epidemiology of infectious diseases. Brief review of molecular biology. Evaluation of methods used in outbreaks and epidemics reported in literature. Prerequisite: PABIO 511 or PABIO 512 or permission of instructor. Offered: jointly with ENV H 568/EPI 568; W.

PABIO 580 Pathobiology Seminar (1, max. 15) Research from students, faculty members, and invited speakers is presented and discussed. Topics include immunochemistry, viruses, membranes, infectious diseases, immune response and other related topics.

PABIO 581 Current Literature in Pathobiology (1, max. 15) Develops skills in analyzing data and assessing conclusions through an analysis of current literature in Pathobiology. Focuses on breadth and analytical skills. Prerequisite: enrollment in the pathobiology graduate program.

PABIO 582 Critical Thinking and Research Design in Pathobiology (1.5) *Lingappa* Analysis of issues, hypothesis and experimental design and testing. Credit/no credit only. Prerequisite: graduate standing in pathobiology. Offered: W.

PABIO 590 Selected Topics (1-20, max. 20) Individual offerings focusing on topics such as pathogenesis, immunology, virology, disease agents, bioinformatics and grant writing. Small lecture format. Credit/no credit only. Prerequisite: permission of instructor.

PABIO 598 Didactic Pathobiology (*, max. 12) Supervised teaching experience in pathobiology courses for Ph.D. candidates. Prerequisite: permission of instructor.

PABIO 600 Independent Study or Research (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.

PABIO 700 Master's Thesis (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.

PABIO 800 Doctoral Dissertation (*) Credit/no credit only. Prerequisite: permission of graduate program adviser.

Reserve Officers Training Corps Programs

Aerospace Studies

A S 101 Aerospace Studies 100 (1) Focuses on the basic characteristics of air doctrine; US Air Force mission and organization; functions of United States strategic offensive and defensive, general-purpose, and aerospace support forces; officership/professionalism and an introduction to communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: A.

A S 102 Aerospace Studies 100 (1) Focuses on the basic characteristics of air doctrine; US Air Force mission and organization; functions of United States strategic offensive and defensive, general-purpose, and aerospace support forces; officership/professionalism and an introduction to communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: W.

A S 103 Aerospace Studies 100 (1) Focuses on the basic characteristics of air doctrine; US Air Force mission and organization; functions of United States strategic offensive and defensive, general-purpose, and aerospace support forces; officership/professionalism and an introduction to communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: Sp.

A S 211 Aerospace Studies 200 (1) Factors contributing to the development of air power from its beginnings to the present, and the evolution of air power concepts and doctrine. History of air power employment in military and nonmilitary operations in support of national objectives. Assessment of communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: A.

A S 212 Aerospace Studies 200 (1) Factors contributing to the development of air power from its beginnings to the present, and the evolution of air power concepts and doctrine. History of air power employment in military and nonmilitary operations in support of national objectives. Assessment of communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: W.

A S 213 Aerospace Studies 200 (1) Factors contributing to the development of air power from its beginnings to the present, and the evolution of air power concepts and doctrine. History of air power employment in military and nonmilitary operations in support of national objectives. Assessment of communicative skills. Additional one-hour leadership laboratory is mandatory for cadets, but not special students. Offered: Sp.

A S 331 Aerospace Studies 300 (3) Emphasis on leadership and management fundamentals, professional knowledge, leadership ethics, and communicative skills required of an Air Force officer. Case studies used to examine leadership and management situations. An additional leadership laboratory (mandatory for cadets but not special students) provides leadership experiences, giving students the opportunity to apply learned principles. Offered: A.

A S 332 Aerospace Studies 300 (3) Emphasis on leadership and management fundamentals, professional knowledge, leadership ethics, and communicative skills required of an Air Force

officer. Case studies used to examine leadership and management situations. An additional leadership laboratory (mandatory for cadets but not special students) provides leadership experiences, giving students the opportunity to apply learned principles. Offered: W.

A S 333 Aerospace Studies 300 (3) Emphasis on leadership and management fundamentals, professional knowledge, leadership ethics, and communicative skills required of an Air Force officer. Case studies used to examine leadership and management situations. An additional leadership laboratory (mandatory for cadets but not special students) provides leadership experiences, giving students the opportunity to apply learned principles. Offered: Sp.

A S 431 Aerospace Studies 400 (3) I&S Needs for national security, evolution of American defense strategy and policy, methods for managing conflict, alliances and regional security to preserve American interests. Arms control and terrorism. The military as a profession, officership, the military justice system, current military issues; refinement of communicative skills. A one-hour leadership laboratory is also required for cadets, but not special students. Offered: A.

A S 432 Aerospace Studies 400 (3) I&S Needs for national security, evolution of American defense strategy and policy, methods for managing conflict, alliances and regional security to preserve American interests. Arms control and terrorism. The military as a profession, officership, the military justice system, current military issues; refinement of communicative skills. A one-hour leadership laboratory is also required for cadets, but not special students. Offered: W.

A S 433 Aerospace Studies 400 (3) I&S Needs for national security, evolution of American defense strategy and policy, methods for managing conflict, alliances and regional security to preserve American interests. Arms control and terrorism. The military as a profession, officership, the military justice system, current military issues; refinement of communicative skills. A one-hour leadership laboratory is also required for cadets, but not special students. Offered: Sp.

Military Science

M SCI 101 Military Science I: Basic (2) History, organization, and mission of the United States Army and the Reserve Officer Training Corps. Relationship to the citizen's military and civilian obligations. Functions and organization of the United States defense establishment. Fundamentals of leadership and management. Leadership laboratories and two field training exercises conducted during the year encompass training in field craft, survival, and small unit tactics. Offered: AWSp.

M SCI 102 Military Science I: Basic (2) History, organization, and mission of the United States Army and the Reserve Officer Training Corps. Relationship to the citizen's military and civilian obligations. Functions and organization of the United States defense establishment. Fundamentals of leadership and management. Leadership laboratories and two field training exercises conducted during the year encompass

training in field craft, survival, and small unit tactics. Offered: AWSp.

M SCI 103 Military Science I: Basic (2) History, organization, and mission of the United States Army and the Reserve Officer Training Corps. Relationship to the citizen's military and civilian obligations. Functions and organization of the United States defense establishment. Fundamentals of leadership and management. Leadership laboratories and two field training exercises conducted during the year encompass training in field craft, survival, and small unit tactics. Offered: AWSp.

M SCI 201 Military Science II: Basic (2) Develops proficiency in oral and written communications. Presents a perspective on the world wide military threat; an evaluation of tactical methodologies of the hostile nations to include conventional weapon systems employment. Control, prevention, and treatment of combat or emergency medical situations. Fundamentals of military map reading, compass and field navigation, are taught and applied. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 202 Military Science II: Basic (2) Develops proficiency in oral and written communications. Presents a perspective on the world wide military threat; an evaluation of tactical methodologies of the hostile nations to include conventional weapon systems employment. Control, prevention, and treatment of combat or emergency medical situations. Fundamentals of military map reading, compass and field navigation, are taught and applied. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 203 Military Science II: Basic (2) Develops proficiency in oral and written communications. Presents a perspective on the world wide military threat; an evaluation of tactical methodologies of the hostile nations to include conventional weapon systems employment. Control, prevention, and treatment of combat or emergency medical situations. Fundamentals of military map reading, compass and field navigation, are taught and applied. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 301 Military Science III: Advanced (3) Small-unit tactics, emphasizing the importance of firepower, movement, and communications. Duties, responsibilities, and methods of employment of basic military units. Leader's role in directing and coordinating individuals and military units from squad to company level. Students are introduced to the planning and conduct of individual and group physical conditioning activities, stressing positive motivation to establish high standards of morale and esprit. Principles and techniques of command, control, military management, and leadership are taught and practiced throughout the academic year. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 302 Military Science III: Advanced (3) Small-unit tactics, emphasizing the importance of firepower, movement, and communications. Duties, responsibilities, and methods of employment of basic military units. Leader's role in directing and coordinating individuals and

military units from squad to company level. Students are introduced to the planning and conduct of individual and group physical conditioning activities, stressing positive motivation to establish high standards of morale and esprit. Principles and techniques of command, control, military management, and leadership are taught and practiced throughout the academic year. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 303 Military Science III: Advanced (3)
Small-unit tactics, emphasizing the importance of firepower, movement, and communications. Duties, responsibilities, and methods of employment of basic military units. Leader's role in directing and coordinating individuals and military units from squad to company level. Students are introduced to the planning and conduct of individual and group physical conditioning activities, stressing positive motivation to establish high standards of morale and esprit. Principles and techniques of command, control, military management, and leadership are taught and practiced throughout the academic year. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 305 Practicum-Techniques of Military Instructions (1-3, max. 3) Analysis, review of techniques used in military training and instructions. Students plan, rehearse, deliver, provide written critique on block of military instruction from the Military Qualification Skills Manual.

M SCI 401 Military Science IV: Advanced (3)
I&S The Army officer's position in contemporary world and impact on problems within the military service. Use of a developmental study to provide awareness of personal responsibilities and official relationships of an Army officer. Organization and functions of command and staff positions. Coordination of administration, logistics, and planning for military operations. Basic concepts of legislative and executive authority for the Uniform Code of Military Justice (to include a study of the officer's authority and responsibility within the military justice system). Problem-solving techniques used by small-unit leaders, emphasizing coordination and planning by the junior officer. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 402 Military Science IV: Advanced (3)
I&S The Army officer's position in contemporary world and impact on problems within the military service. Use of a developmental study to provide awareness of personal responsibilities and official relationships of an Army officer. Organization and functions of command and staff positions. Coordination of administration, logistics, and planning for military operations. Basic concepts of legislative and executive authority for the Uniform Code of Military Justice (to include a study of the officer's authority and responsibility within the military justice system). Problem-solving techniques used by small-unit leaders, emphasizing coordination and planning by the junior officer. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

M SCI 403 Military Science IV: Advanced (3)
I&S The Army officer's position in contemporary world and impact on problems within the military service. Use of a developmental study to provide awareness of personal responsibilities and

official relationships of an Army officer. Organization and functions of command and staff positions. Coordination of administration, logistics, and planning for military operations. Basic concepts of legislative and executive authority for the Uniform Code of Military Justice (to include a study of the officer's authority and responsibility within the military justice system). Problem-solving techniques used by small-unit leaders, emphasizing coordination and planning by the junior officer. Leadership laboratories and two field training exercises during the year. Offered: AWSp.

Naval Science

N SCI 111 The Naval Service (3) *Beznoska*
General introduction to the Navy, its organization, missions, roles, tasks, and operating methods. The relationship to the other services within the Department of Defense is emphasized. Offered: A.

N SCI 112 History of U.S. Sea Power I (2)
Neely A comprehensive study of the role of sea power in the history of the United States, the current status of the various elements of the nation's sea power as they influence the development and implementation of national security policy. Offered: W.

N SCI 113 History of U.S. Sea Power II (2)
Neely A comprehensive study of the role of sea power in the history of the United States, the current status of the various elements of the nation's sea power as they influence the development and implementation of national security policy. Offered: Sp.

N SCI 211 Naval Weapon Systems (3) *Longazel*
Study of fundamental principles of sensor, tracking, weapon delivery subsystems, and current naval weapons. Includes techniques of linear analysis of ballistics and weapons, and dynamics of basic components of weapon-control systems. Offered: A.

N SCI 212 Naval Ship Systems I (3) *Longazel*
Study of fundamental principles of energy transfer and thermodynamics. An introduction to nuclear propulsion, gas turbines, and auxiliary power systems. Offered: Sp.

N SCI 213 Naval Ship Systems II (3) *Longazel*
Study of ship characteristics, ship design, hydrodynamic forces, stability, damage control, and shipboard electrical systems. Includes introduction to engineering documentation, electrical safety, preventative maintenance, and personnel qualifications. Offered: Sp.

N SCI 311 Navigation (3) *NW Partridge*
The science and practice of maritime coastal navigation, including visual fixing, dead reckoning, and piloting methods. Computation of tides and currents and nautical rules of the road. Offered: A.

N SCI 312 Navigation II (3) *NW Partridge*
Basic theory and practice of celestial and electronic navigation. Relative motion theory and contact coordination practice in a multiple ship environment. Offered: W.

N SCI 313 Naval Operations (3) *Partridge*
Introduction to naval operations, the employment of naval forces, naval tactics, formulation of operations plans and orders, employment of detection equipment, and meteorology. Offered: Sp.

N SCI 321 Evolution of Warfare I (3) *Pochop*
Introduction to the art of war, the evolution of warfare from the earliest recorded battles to the present day. Offered: A.

N SCI 322 Evolution of Warfare II (3) *Pochop*
Introduction to the art of war, the evolution of warfare from the earliest recorded battles to the present day. Prerequisite: N SCI 321. Offered: W.

N SCI 323 USMC Leadership and Administration of Justice I (3) *Pochop*
Concepts, objectives, characteristic qualities, and practical techniques of leadership as exercised by the Marine Corps officer. Emphasizes leadership and management role of the junior officer in the Fleet Marine Forces. Intensive physical activities and outdoor projects to test an individual's physical and mental endurance. Offered: Sp.

N SCI 411 Introduction to Naval Leadership (3) *I&S Keith*
Introduction of the theory and techniques of naval leadership based on those principles of behavioral science that are pertinent to understanding individual and group behavior of adults. Introduces the management process and the relationship of management functions to leadership. Stresses acceptance of a traditional deep sense of moral responsibility on the part of the aspiring leader. Offered: A.

N SCI 412 Military Leadership and Ethics (3) *I&S Keith*
Study of leadership and ethics within a military context using applicable case studies. Examines the Law of Armed Conflict and Code of Conduct; the importance of integrity, moral courage, and ethical behavior to effective leadership; and the interrelationship between authority, responsibility, and accountability. Offered: W.

N SCI 413 Naval Organization and Management (3) *I&S Keith*
Study of organization, systems, and techniques employed in the Navy for management of its human, material, and financial resources. Some of the work relates to the administration of discipline in the Navy under the Uniform Code of Military Justice. Emphasis is placed on the leadership and management role of the junior officer in the fleet. Offered: Sp.

N SCI 421 Amphibious Warfare I (3) *Pochop*
Provide basic knowledge of evolution of amphibious warfare from premodern era to present. Strategic and tactical considerations in planning specific operations and amphibious landings. Offered: A.

N SCI 422 Amphibious Warfare II (3) *Pochop*
Provide basic knowledge of evolution of amphibious warfare from premodern era to present. Strategic and tactical considerations in planning specific operations and amphibious landings. Prerequisite: N SCI 421. Offered: W.

N SCI 423 USMC Leadership and Administration of Justice II (3) *Pochop*
Concepts, objectives, characteristic qualities, and practical techniques of leadership as exercised by the Marine Corps officer. Emphasizes the leadership and management role of the junior officer in the Fleet Marine Forces. Intensive physical activities and outdoor projects to test an individual's physical and mental endurance. Offered: Sp.

School of Social Work

Social Welfare

SOC WF 101 Social Work in Action: Bridging the Gap From Science to Service (5) I&S

Explores current social work practice and research applied to major societal problems. Lectures and discussions by leading faculty introduce students to the evidence-based perspective underlying program planning and practice innovation. Topics include: juvenile delinquency, child maltreatment, domestic violence, foster care reform, mental health, school violence, substance abuse, and poverty. Offered: A.

SOC WF 200 Introduction to Social Welfare Practice (5) I&S Introduction to the field of social work, including the theoretical concepts and institutional framework that guide practice. Overview of social work profession and social welfare system within which it operates. Lectures supplemented by exercises, films, guest lectures, and class discussions. Offered: A.

SOC WF 310 Social Welfare Practice I (3) Whittaker Provides an introduction to the roles, tasks, and functions of the social welfare practitioner and to theories and methods of intervention; a conceptual framework for social work practice with individuals, families, and small groups; and an opportunity to develop skills in problem assessment, intervention, termination, and evaluation. Offered: A.

SOC WF 311 Social Welfare Practice II (3) Whittaker Provides an introduction to the roles, tasks, and functions of the social welfare practitioner and to theories and methods of intervention; a conceptual framework for social work practice with individuals, families, and small groups; and an opportunity to develop skills in problem assessment, intervention, termination, and evaluation. Prerequisite: SOC WF 310. Offered: W.

SOC WF 312 Social Welfare Practice III (3) Duplica, Whittaker Focus on macro systems in a diverse society using the generalist perspective. The implications of system resources and configurations for meeting human needs are considered. The role and function of generalist social workers to understand and advocate for system development and change is emphasized. Prerequisite: SOC WF 311. Offered: Sp.

SOC WF 320 Social Welfare Policy (5) I&S Duplica Emphasizes policy and program development in social welfare with emphasis on the context, making, and unmaking of social policy. Covers policy formulation as well as current and emerging policies in social welfare. Prerequisite: SOC WF 200. Offered: WSp.

SOC WF 390 Introduction to Social Welfare Research (5) Balassone, Roffman Introduction to the logic of the scientific method as applied to social work and social welfare practice, to the design and conduct of a research study, and to data collection and summarization. Skill development in critical consumption of social welfare research. Prerequisite: either STAT 220 or QMETH 201. Offered: A.

SOC WF 402 Human Behavior and Social Environment I (5) I&S First of two-quarter sequence focusing on understanding human development across the lifespan. Integrates biological, psychological, structural, environmen-

tal, political, global, and socio-cultural perspectives. Explores relationship between the person and the environment including families, groups, organizations, communities, and institutions.

SOC WF 403 Human Behavior and Social Environment II (5) I&S Continuation of SOC WF 402. Prerequisite: SOC WF 402.

SOC WF 404 Cultural Diversity and Justice (5) I&S Duplica, Sohng History and culture of disadvantaged and oppressed groups served by Social Welfare generalist practitioners. Offered: Sp.

SOC WF 409 Readings in Social Welfare (1-5, max. 15)

SOC WF 419 Adult Development and Aging (3) I&S Introduces the field of adult development. Interdisciplinary perspective stressing the interaction of psychological, social, and physiological factors affecting the aging process. Goals are to help the student understand the processes and diversity in the aging process that can assist one's own aging and help the learner work with older adults. Offered: Sp.

SOC WF 421 Methods of Child Care and Treatment (3) Whittaker Focuses on an introduction to the continuum of child welfare services and presents practical approaches to working with children and adolescents in a wide variety of practice settings. Offered: alternate years; A.

SOC WF 430 Child Care Work Practice (3) Whittaker Specialized practice with emotionally disturbed and delinquent children in group-care settings with focus on providing child-care staff with specific tools for teaching alternative behavior. Major topics include: etiology and diagnosis, observing and recording children's behavior, special problems of group living, life-space interviewing, token economies, activity programming, group interventions, parental involvement, organizational requisites and community linkages. Offered: alternate years; A.

SOC WF 442 Building Competencies for Intergroup Dialogue Facilitation (3) Focuses on both knowledge and skills development for peer facilitators. Topics include philosophy and principles of dialogic education and dialogic communication; intergroup communication; social identity development; principles of working with conflict; group dynamics, observation, and facilitation; team building among co-facilitators; and creating a support system among instructors and facilitators. Credit/no credit only.

SOC WF 443 Facilitating Intergroup Dialogue (5) Practicum seminar providing instruction, consultation, and supervision of peer group facilitators. Focuses on comparison of facilitation experiences and consultations, trouble-shooting with other facilitators, co-facilitator team building, and planning for dialogues. Exploration of specific, current intergroup issues, such as affirmative action and immigration. Continuation of team-building work begun in 452. Credit/no credit only.

SOC WF 490 Research in Social Welfare (1-3, max. 10) Individual work with faculty member to assist with current research project (s). Students trained and supervised in some or all of the following research tasks: literature review, data

analysis, record-keeping, interviewing, report writing, data entry and coding, data collection, and other tasks commonly found in research problems in social welfare. Credit/no credit only.

SOC WF 495 Special Topics in Generalist Social Welfare (1-5, max. 5) Readings, lectures, and discussions pertaining to significant topics of special and current interest to social workers.

SOC WF 554 Globalization and International and National Social Welfare Issues and Politics (3) Critical examination of globalization and its implications for the historic and contemporary development, formulation, and adoption of policies related to international and national social welfare. Emphasizes the development of conceptual frameworks that further understanding of the complex interplay of international and national issues and social welfare policies.

Social Welfare

SOC WL 552 Analytical Perspectives on Social Welfare Policy (3) Broad overview of the social welfare policy process, including epistemological issues, content on social problem construction and definition, policy agendas and case study methodology. Introduction to analytical tools and concepts needed to take a proactive role in policy development, advocacy, implementation, and policy research. Offered: Sp.

SOC WL 553 Seminar in Contemporary Social Welfare Policy (3) Critical review of contemporary American income maintenance and related social welfare policies, and the economic, political, and social factors that affect their development, implementation, and effectiveness. Evaluation of their effects on poverty, income inequality, and related social outcomes, including international comparisons. Assessment of proposals for reform. Closely linked to 552. Offered: Sp.

SOC WL 558 Integrative Seminar (1-2, max. 2) Topic-driven seminar that targets professional development of the first and second years (scholarship, research, teaching). Active participation expected in discussions and reflective papers. May require preparation for presentation or demonstration. Offered: A.

SOC WL 559 Doctoral Seminar in Teaching Preparation (3) Focus on teaching content and issues integral to being a skillful instructor. Issues and related skills generalized to range of post-graduate positions. Promote understanding of pedagogical issues and development of specific teaching skills. Credit/no credit only. Prerequisite: doctoral student. Offered: A.

SOC WL 578 Seminar in Special Topics for NIMH Prevention Research Trainees (1, max. 9) Interdisciplinary overview of major concepts in promotion of mental health and prevention of mental distress with prevention science as framework. Provides conceptual foundations for advanced study in specialized aspects of mental health prevention research. Prerequisite: enrollment in Social Welfare Predoctoral Training Program in Prevention of Mental Health Problems and Disorders. Credit/no credit only. Offered: AWSp.

SOC WL 579 Interdisciplinary Approaches to Prevention Science: Children and Adolescents (3) Overview of theory, research, and practice in prevention science. Developmental perspective examining factors that promote or inhibit health development at different stages and during transitions (focus on birth through age 21). Designed for interdisciplinary dialogue, and includes guest faculty from around the University who are specialists in course topics. Credit/no credit only. Offered: A.

SOC WL 580 Introduction to Advanced Research Method and Design (3) Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: A.

SOC WL 581 Introduction to Advanced Research Method and Design (3) Introduction to the broad scientific issues and the specific methodological strategies used in formulating and answering research questions within the field of social welfare. Offered: W.

SOC WL 582 Research Practicum (3-) Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

SOC WL 583 Research Practicum (-3) Development of specific methodological skills in social welfare research through participation in an ongoing research project. Learning contract used to target specific research competencies. Credit/no credit only. Offered: ASpS.

SOC WL 584 Teaching Practicum (3) Supervised teaching of a required course or teaching as a co-instructor with a faculty member. Learning contract used to target specific teaching competencies, e.g., assessing and evaluating student outcomes, identifying class session goals and objectives, tailoring instruction methods to diverse learning styles. Offered: ASpS.

SOC WL 585 Qualitative Methods in Social Work Research I (3) The first in a two-quarter sequence offering intensive experience in the theory and application of qualitative and ethnographic research methods. Prepares students for conducting qualitative studies and for combining qualitative and quantitative research methods. Focuses on applications especially relevant to social welfare.

SOC WL 586 Qualitative Methods in Social Work Research II (3) The second in a two-quarter sequence offering intensive experience in the theory and application of qualitative and ethnographic research methods. Prepares students for conducting qualitative studies and for combining qualitative and quantitative research methods. Focuses on applications especially relevant to social welfare.

SOC WL 587 Fundamentals of Social Work Statistics I (4) Descriptive and inferential statistics. Underlying logic of statistical inference. Statistical issues of special relevance in social work, including measurement, research design, and ethics in research. Prerequisite: concurrent registration in SOC WL 580. Offered: A.

SOC WL 588 Fundamentals of Social Work Statistics II (4) Issues in the use of descriptive and inferential statistics, especially the statistical

control of extraneous variables. Applications of statistical inference in factorial design, and correlation and regression. Statistical issues of special relevance in social work. Ethics in the use of statistics. Prerequisite: concurrent registration in SOC WL 581. Offered: W.

SOC WL 589 Multivariate Data Analysis for the Social Sciences (3, max. 6) *Eroshva* Provides social scientists with an introduction to multivariate analysis techniques and the knowledge to carry them out. Focuses on statistical methods that explore relationships between observed variables. Topics include principal components, cluster, factor, latent class analysis. Prerequisite: SOC WL 587, 588, or equivalent. Offered: jointly with CS&SS 589; A.

SOC WL 590 Topics in Advanced Research Methods (3) Special topics in social and behavioral research design for advanced graduate students. Topics vary and focus on community-based research methods and measurement construction for culturally diverse populations. Prerequisite: doctoral student in social welfare or related discipline; advanced master's level students by permission of instructor.

SOC WL 598 Research Problems and Priorities in Social Work and Social Welfare (3-) Provides students with foundations in the definitions of theory; the socially constructed nature of theory and definition of social "problems"; conceptual and theoretical perspectives on human society, interaction, and change; and analysis of current conceptual models in social welfare literature. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: A.

SOC WL 599 Research Problems and Priorities in Social Work and Social Welfare (-3) Assists students in applying theory in building an original conceptual model. Emphasizes critical thinking, including ideological, political, methodological, and ethical contexts/implications of ideas, theories, and models that shape social welfare scholarship and its application to social practice. Prerequisite: admission to social welfare Ph.D. program or permission of instructor. Offered: W.

SOC WL 600 Independent Study or Research (*) Prerequisite: approval of a well-specified plan by the instructor and program director. Includes a written product. Offered: ASpS.

SOC WL 800 Doctoral Dissertation (*) Offered: ASpS.

Social Work

SOC W 500 Intellectual and Historical Foundations of Professional Social Work Practice (3) Intellectual, historical, and ethical foundations of the social work profession. Engagement with crucial aspects of the profession's history; contemporary issues, problematics, and directions; and key concepts and theoretical frameworks. Students develop personal, professional, and intellectual foundations for practicing social work built on the central values of plurality and social justice.

SOC W 501 Poverty and Inequality (3) Analysis of poverty and inequality in United States. Analytic and descriptive focus on measurement, processes of production and perpetuation, and public policy responses. Examines causes of poverty, the role of policy, and socioeconomic

dimensions of stratification, including race, ethnicity, class, gender, immigration status, disability, age, sexual orientation, and family structure.

SOC W 503 Social Work for Social Justice: Developing a Personal-Professional Stance I (1-3-, max. 3) Focuses on personal and professional development toward social work practice for social justice. Employs critically self-reflective, experiential, and dialogic learning processes to engage students to explore personal meaning systems and narratives in the context of professional values of social justice, multiculturalism, empowerment, and globalization.

SOC W 504 Social Work for Social Justice: Developing a Personal-Professional Stance II (-1-3, max. 3) Focuses on personal and professional development toward social work practice for social justice. Employs critically self-reflective, experiential, and dialogic learning processes to engage students to explore personal meaning systems and narratives in the context of professional values of social justice, multiculturalism, empowerment, and globalization.

SOC W 505 Foundations of Social Welfare Research (3) *Almgren, Balassone, Erera, Roffman* Overview of research process/methods in social work, with focus on consuming and performing practice-related research and evaluating one's own practice. Emphasis on critical understanding of empirical literature, development of useful and appropriate questions about social work practice, and strategies and techniques for doing research and applying findings to practice. Offered: Sp.

SOC W 506 Social Welfare Research and Evaluation (3) Second of a two-quarter research sequence. Introduces a range of methods for informing evidenced-based social work practice. Emphasizes critical appraisal of the literature, development of research questions, and strategies and techniques for conducting practice-relevant research, including data collection and analysis.

SOC W 510 Practice I: Introduction to Social Work Practice (3) *Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Assists students toward mastery of interviewing and relationship building skills and knowledge of cross-cultural communication and practice issues and of social work values and ethics. Provides opportunity to develop beginning level skills in assessment. Offered: ASp.

SOC W 511 Practice II: Intermediate Direct Service Practice (3) *Kemp, Marcenko, Richey, Roffman* Foundation knowledge and skills for direct practice with individuals, families, and groups. Course assists students toward mastery in assessment, development of treatment plans based on theory and assessment information, goalsetting skills, and selection of appropriate interventions. Offered: AW.

SOC W 512 Practice III: Organizational Practice (3) *Fredriksen, Krulich, Uehara* Focuses on ways in which management activities contribute to service effectiveness for clients and quality of conditions for staff. Various managerial roles, functions, and skills examined. Impact of agency structure, culture, and mission on staff, clients, and organizational outcomes discussed with emphasis on ways social work managers influence change. Offered: W.

SOC W 513 Practice IV: Community Change Practice (3) *Weatherley* Provides frame of reference and skills for community-based social work practice. Theories of social change are examined with examples drawn from community organizing and policy advocacy. Offered: Sp.

SOC W 514 Foundation Practice Skills (3) Focus on the teaching of practice skills (micro, mezzo, and/or macro) associated with key contemporary themes in social work. Possible topics include social work with American Indian communities, adult interpersonal violence, and assessment and brief intervention in substance abuse and dependence. Offered: SpS.

SOC W 524 Foundation Practicum (1-8, max. 12) *DeLong, Rivara, Roberts* Agency-based practicum with emphasis on development of knowledge, perspectives, and skills needed for

practice with individuals, families, groups, organizations, and communities. Credit/no credit only. Prerequisite: social work major. Offered: AWSpS.

SOC W 585 Advanced Group Work (3) Overview of group work and major theorist in the field. Examines differential applicability of methods across diverse populations. Emphasis on developing powers of observation of group process (as opposed to content) and on ability to intervene at the group level (as opposed to individual level). Prerequisite: Group work experience.

SOC W 596 Statistics in Social Work (1-3max. 3) Introductory foundation in descriptive statistics, probability theory, statistical inference, and bivariate statistics commonly used in evaluations of social program and clinical

practice. Conceptual emphasis on understanding the logic of measurement and statistical inference. Understanding reinforced by hand calculations involving high school algebra. Fulfills SOC W 505 prerequisite.

SOC W 598 Integrative Seminar (1-5, max. 12) Integrates specialized knowledge in social work settings. Offered: AWSp.

SOC W 599 Readings in Social Work (*) Independent Studies. Credit/no credit only. Prerequisite: permission of instructor. Offered: AWSp.

SOC W 600 Independent Study or Research (*).

SOC W 700 Master's Thesis (*).

Faculty

The following are listings of all teaching faculty at the University of Washington, listed by primary appointment. Some interdisciplinary programs (such as the Program on the Environment or Comparative History of Ideas) are comprised of adjunct and affiliate appointments. For a list of faculty associated with such programs or for a complete list of all faculty associated with a department or program, please visit the online General Catalog at <http://www.washington.edu/students/genca/>.

College of Architecture and Urban Planning

Architecture

Professor

BONSTEEL, DAVID; MArch, 1964, UNIVERSITY OF WASHINGTON; design process, computer applications, research.

BOSWORTH, THOMAS L.; MA, 1954, OBERLIN COLLEGE; MArch, 1960, YALE UNIVERSITY; design process, history, professional practice

HILDEBRAND, GRANT; MArch, 1964, UNIVERSITY OF MICHIGAN; history, preservation design

JACOBSON, PHILLIP L.; MArch, 1969, FINNISH INSTITUTE OF TECHNOLOGY; design, professional practice

JOHNSTON, NORMAN J.; PhD, 1964, UNIVERSITY OF PENNSYLVANIA; urban design, history

KIYAK, H ASUMAN; PhD, 1977, WAYNE STATE UNIVERSITY; geriatric dentistry, behavioral aspects of health care

KOLB, KEITH R.; MArch, 1950, HARVARD UNIVERSITY; design, professional practice

LOVELAND, JOEL E.; MArch, 1980, UNIVERSITY OF CALIFORNIA (LOS ANGELES); energy conservation, design, research.

LOVETT, WENDELL H.; MArch, 1948, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; architecture.

MILLET, MARIETTA; MArch, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; illumination, environmental controls.

SELIGMANN, CLAUD; Arch (Dipl), 1950, LONDON POLYTECHNIC (UK); design, design process, theory.

SMALL, ROBERT; MArch, 1955, UNIVERSITY OF OREGON; design, community practice, barrier-free design, housing, site planning, design process.

STREISSGUTH, DANIEL M.; MArch, 1949, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; design process

THIEL, PHILIP; MS, 1948, UNIVERSITY OF MICHIGAN; visual design, design process, person-environment relations, experiential notation

ZARINA, ASTRA; MArch, 1955, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; design, foreign studies.

Associate Professor

ALBRECHT, ROBERT G.; MSCE, 1960, UNIVERSITY OF MASSACHUSETTS; structures.

CURTIS, J WILLIAM; MA, 1969, UNIVERSITY OF WASHINGTON; design process, professional studies.

DONNETTE, JAMES J.; MArch, 1969, UNIVERSITY OF WASHINGTON; graphics, design

JONES, SUSAN H.; MArch, 1988, HARVARD UNIVERSITY; architectural design: the conceptual and tectonic ideas of making space

LATOURELLE, ELAINE DAY; MArch, 1964, YALE UNIVERSITY; Architecture, Landscape and Urban Design, Professional Practice

PRAKASH, VIKRAMADITYA; PhD, 1994, CORNELL UNIVERSITY; Non-western, Asian, Indian Architecture; cultural and postcolonial studies; LeCorbusier; modernism

SASANOFF, ROBERT; MCP, 1968, UNIVERSITY OF CALIFORNIA (BERKELEY); design process, person-environment relations.

Assistant Professor

HEERWAGEN, JUDITH; PhD, 1982, UNIVERSITY OF WASHINGTON; behavioral ecology

Lecturer

DEE, JENNIFER; MArch, 1984, UNIVERSITY OF WASHINGTON; theory, design.

NICHOLLS, JAMES KEITH; BArch, 1986, UNIVERSITY OF BRITISH COLUMBIA (CANADA); design, industrial design, construction technology

Construction Management

Associate Professor

SCHAUFELBERGER, JOHN E.; PhD, 1971, UNIVERSITY OF ILLINOIS; construction project management, construction business management, contract procurement

TORRENCE, GERARD R.; MS, 1950, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; structures

Assistant Professor

ABDEL AZIZ, AHMED; PhD, 2000, UNIVERSITY OF BRITISH COLUMBIA (CANADA); construction & project management, project controls, methods for building & heavy construction

PACE, CLARK B.; PhD, 1999, UNIVERSITY OF CALIFORNIA (BERKELEY); real estate development, advanced cost analysis, labor projections, construction safety

Landscape Architecture Professor

BUCHANAN, ROBERT T.; MLA, 1956, HARVARD UNIVERSITY; design, graphic communications, landscape esthetics, environmental art

HAAG, RICHARD; MLA, 1952, HARVARD UNIVERSITY; theory and perception of landscapes, master planning, urban recreation, recycling landscapes

JOHNSTON, NORMAN J.; PhD, 1964, UNIVERSITY OF PENNSYLVANIA; urban design, history

SCHAUMAN, SALLY; MS, 1971, UNIVERSITY OF MICHIGAN; visual resource analysis and evaluation, resource planning and conservation of stressed landscapes

Associate Professor

CHALKER-SCOTT, LINDA; PhD, 1988, OREGON STATE UNIVERSITY; environmental stress physiology of woody plants

HILL, KRISTINA; PhD, 1997, HARVARD UNIVERSITY; human dimensions of landscape change; urban ecology; urban design related to water and biodiversity;

ROBERTSON, IAIN M.; MLA, 1975, UNIVERSITY OF PENNSYLVANIA; designing with plants, planning and design of botanical gardens/arboreta

Research Associate Professor

HORNER, RICHARD R.; PhD, 1978, UNIVERSITY OF WASHINGTON; Effects of human activities on water resources in urban areas.

BOOTH, DEREK B.; PhD, 1984, UNIVERSITY OF WASHINGTON; Environmental geology, particularly human influences on hillslopes, runoff, and rivers.

WAGNER, FREDRICK W.; PhD, 1974, UNIVERSITY OF WASHINGTON; urban & regional planning, policies & programs that make communities more livable

Assistant Professor

REICHARD, SARAH E.; PhD, 1994, UNIVERSITY OF WASHINGTON; conservation biology of plants, biological invasions

Urban Design and Planning

Professor

AMOSS, HAROLD L.; PhD, 1951, UNIVERSITY OF CALIFORNIA (BERKELEY); planned social change, community organization

BELL, EARL J.; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); application of operations research methods to urban and regional planning problems, mathematical pro

BLANCO, HILDA J.; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); Factors influencing urban sprawl; the implications of cognitive science and evolutionary theory for

DUBROW, GAIL LEE; PhD, 1991, UNIVERSITY OF CALIFORNIA (LOS ANGELES); the social history of the built environment; historic preservation; issues of race, class and gender

GREY, ARTHUR L.; PhD, 1954, UNIVERSITY OF CALIFORNIA (BERKELEY); scope of urban planning, land and development policy, uses of remote sensing in urban planning, econ

HANCOCK, JOHN L.; PhD, 1964, UNIVERSITY OF PENNSYLVANIA; planning history, urban history, planning theory, social analysis and social evaluation methods, com

JOHNSTON, NORMAN J.; PhD, 1964, UNIVERSITY OF PENNSYLVANIA; urban design, history

LUDWIG, RICHARD L.; PhD, 1971, UNIVERSITY OF PITTSBURGH; housing development planning, social factors in development planning

UNTERMANN, RICHARD K.; MLA, 1967, HARVARD UNIVERSITY; urban design and site planning, housing, recreation, nonmotorized circulation

VERNEZ-MOUDON, ANNE; DSc, 1987, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; urban design, city form and neighborhood studies, design research

Research Professor

BOOTH, DEREK B.; PhD, 1984, UNIVERSITY OF WASHINGTON; Environmental geology, particularly human influences on hillslopes, runoff, and rivers.

WAGNER, FREDRICK W.; PhD, 1974, UNIVERSITY OF WASHINGTON; urban & regional planning, policies & programs that make communities more livable

Associate Professor

ALBERTI, MARINA; PhD, 1992, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; Environmental planning, urban ecology, impact assessment, geographic information systems, conflict m

KASPRISIN, RONALD J.; MUP, 1968, UNIVERSITY OF WASHINGTON; community design studios, town planning, planning/design communications, urban design principles

PURCELL, MARK H.; PhD, 1998, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Nevinsian aspatial holistic geography

RYAN, DENNIS M.; PhD, 1976, UNIVERSITY OF PENNSYLVANIA; Educational democracy, theory and practice of interdisciplinary education; urban design and planning

Assistant Professor

BORN, BRANDEN M.; PhD, 2003, UNIVERSITY OF WISCONSIN; Land use/regional planning, planning process and collaboration, social justice, and food systems

WEEKS, ROBIN J.; PhD, 1988, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); remote sensing, model inversions

College of Arts and Sciences

American Ethnic Studies

Professor

FLORES, LAURO H.; PhD, 1980, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Chicano literature, contemporary Latin American literature (narrative)

Associate Professor

BONUS, ENRIQUE C.; PhD, 1997, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Race and ethnicity; communication, education and culture; Asian American studies.
GAMBOA, ERASMO; PhD, 1984, UNIVERSITY OF WASHINGTON; history, Chicano experience, Pacific Northwest.
SALAS, ELIZABETH; PhD, 1987, UNIVERSITY OF CALIFORNIA (LOS ANGELES); New Mexican history and politics, Chicana, Mexicana and Chicano history, minorities in the military

Lecturer

MAULANA, SEYED M.; MUP, 1988, UNIVERSITY OF WASHINGTON; African and African American studies, Swahili
SO, CONNIE C.; MPA, 1989, PRINCETON UNIVERSITY; Asian Pacific Islander history and culture; American ethnicity, identity, and politics

American Indian Studies

Professor

HART, DANIEL; MFA, 1985, TEMPLE UNIVERSITY; visual anthropology

Assistant Professor

MILLION, DIAN L.; MA, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); American Indian literature and social studies, critical theory, race and ethnicity

Anthropology

Professor

BRANNEN, GEORGE; MD, 1969, NORTHWESTERN UNIVERSITY; general adult urology, third-world medicine
CLOSE, ANGELA E.; PhD, 1976, CAMBRIDGE UNIVERSITY (UK); Archaeology; Lithic Analysis; Prehistory of North Africa; human origins

DUNNELL, ROBERT C.; PhD, 1967, YALE UNIVERSITY; archaeological theory, field method, eastern North America
GRAYSON, DONALD K.; PhD, 1973, UNIVERSITY OF OREGON; North American prehistory, paleoecology, vertebrate faunal analysis, history of archaeology
HARRELL, STEVAN; PhD, 1974, STANFORD UNIVERSITY; family systems, demography, social evolution, religion, China, Taiwan
HUTTERER, KARL L.; PhD, 1973, UNIVERSITY OF HAWAII; prehistory, ethnology of Southeast Asia, East Asia
NASON, JAMES; PhD, 1970, UNIVERSITY OF WASHINGTON; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America
NEWELL, LAURA L.; PhD, 1967, UNIVERSITY OF WASHINGTON; primatology growth and development, human biology, evolutionary aspects of dermatoglyphics
NUTE, PETER E.; PhD, 1969, DUKE UNIVERSITY; genetics and evolution
OTTENBERG, SIMON; PhD, 1957, NORTHWESTERN UNIVERSITY; art, aesthetics, politics, law, ethnicity.
SIVARAMAKRISHNAN, K.; PhD, 1996, YALE UNIVERSITY; Environment, development and the State in south Asian agrarian societies.
SPAIN, DAVID H.; PhD, 1969, NORTHWESTERN UNIVERSITY; psychocultural anthropology, African studies, research methods
SWINDLER, DARIS R.; PhD, 1959, UNIVERSITY OF PENNSYLVANIA; primate dentition, anatomy and growth and development
WATSON, JAMES B.; PhD, 1948, UNIVERSITY OF CHICAGO; social/cultural anthropology, economic anthropology, Oceania, New Guinea, exchange theory
WENKE, ROBERT J.; PhD, 1975, UNIVERSITY OF MICHIGAN; archaeology of Egypt, the Middle East, and quantitative methods
WINANS, EDGAR V.; PhD, 1959, UNIVERSITY OF CALIFORNIA (LOS ANGELES); politics, economics and law, Africa, the developing world

Associate Professor

ECK, GERALD G.; PhD, 1977, UNIVERSITY OF CALIFORNIA (BERKELEY); primate paleontology, especially African Pliocene-Pleistocene monkeys and hominids
FITZHUGH, J.BEN; PhD, 1996, UNIVERSITY OF MICHIGAN; Archaeology, Anthropology, evolutionary ecology, complex hunter-gatherers, social evolution, settlement

HOLMAN, DARRYL J.; PhD, 1996, PENNSYLVANIA STATE UNIVERSITY; Human population biology, anthropological demography, paleodemography and statistical modeling.

Research Associate Professor

KYES, RANDALL C.; PhD, 1989, UNIVERSITY OF GEORGIA; primate behavior and ecology, neural mechanisms of behavior

Assistant Professor

LOWE, CELIA; PhD, 2000, YALE UNIVERSITY; Critical environmental studies, science studies, nationalism, post-colonial theory, identity, gender
TAYLOR, JANELLE S.; PhD, 1999, UNIVERSITY OF CHICAGO; Anthropology of medicine, science and technology, reproduction, gender, and consumption.

Lecturer

BENTZ, MARILYN G.; PhD, 1984, UNIVERSITY OF WASHINGTON; psychological anthropology, social change, education, North American Indians
GREEN, JAMES W.; PhD, 1972, UNIVERSITY OF WASHINGTON; cross cultural, mental health, comparative aging, religion, West Indies, Pakistan, Islam

Applied Mathematics

Professor

ADAMS, LOYCE M.; PhD, 1983, UNIVERSITY OF VIRGINIA; numerical algorithms for parallel computers
BRETHERTON, CHRISTOPHER S.; PhD, 1984, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology
KUTZ, JOSE NATHAN; PhD, 1994, NORTHWESTERN UNIVERSITY; nonlinear waves, dynamical systems, asymptotic and perturbation methods, scientific computing
MOOLGAVKAR, SURESH H.; PhD, 1973, JOHNS HOPKINS UNIVERSITY; cancer epidemiology, development of quantitative methodology
MURRAY, JAMES D.; PhD, 1956, OXFORD UNIVERSITY (UK); mathematical biology, biological pattern formation, wound healing, spread of epidemics
NAZARETH, JOHN L.; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); numerical optimization

PEARSON, CARL E; PhD, 1949, BROWN UNIVERSITY; wave propagation, fluid dynamics, numerical analysis, optimization
SARACHIK, EDWARD; PhD, 1966, BRANDEIS UNIVERSITY; atmospheric dynamics, air-sea interactions, greenhouse warming, equatorial dynamics, climate change
TUNG, KA KIT; PhD, 1977, HARVARD UNIVERSITY; atmospheric and geophysical fluid dynamics

Associate Professor

QIAN, HONG; PhD, 1989, WASHINGTON UNIVERSITY; mathematical, physical chemistry and biology, statistical physics, stochastic mathematics

Research Assistant Professor

SWANSON, KRISTIN R.; PhD, 1999, UNIVERSITY OF WASHINGTON; mathematical medicine&biology; mathematical modeling of pathological biosystems&imaging; complex sys

Art

Professor

BERGER, PAUL E; MFA, 1973, STATE UNIVERSITY OF NEW YORK (BUFFALO); photography
BRAVMANN, RENE A.; PhD, 1971, INDIANA UNIVERSITY; African art
CARRAHER, RONALD G; MA, 1961, SAN JOSE STATE COLLEGE; photography
CELENTANO, FRANCIS; MA, 1957, NEW YORK UNIVERSITY; painting, drawing
CHRISTOFIDES, C G; PhD, 1956, UNIVERSITY OF MICHIGAN; medieval, seventeenth century, Romanesque
DAHN, RICHARD F; MFA, 1959, YALE UNIVERSITY; graphic design
DAILEY, MICHAEL D; MFA, 1963, UNIVERSITY OF IOWA; painting, drawing
DU PEN, EVERETT; MFA, 1937, YALE UNIVERSITY; sculpture
HIXSON, WILLIAM J; MFA, 1950, UNIVERSITY OF OREGON; painting
HOLM, BILL; MFA, 1951, UNIVERSITY OF WASHINGTON; Northwest Coast Indians
JONES, ROBERT C; MS, 1959, RHODE ISLAND SCHOOL OF DESIGN; painting, drawing
KARTSONIS, ANNA D.; PhD, 1982, NEW YORK UNIVERSITY; Byzantine and medieval art
KEHL, RICHARD L.; MA, 1961, KANSAS CITY ART INSTITUTE; MFA, 1961, KANSAS CITY ART INSTITUTE; painting
KINGSBURY, MARTHA; PhD, 1969, HARVARD UNIVERSITY; nineteenth and twentieth century art

LUNDIN, NORMAN K; MFA, 1963, UNIVERSITY OF CINCINNATI; painting, drawing, art history, contemporary art, art theory
MARSHALL, JOHN C; MFA, 1968, SYRACUSE UNIVERSITY; metal design
MASON, ALDEN; MFA, 1947, UNIVERSITY OF WASHINGTON; painting
NASON, JAMES; PhD, 1970, UNIVERSITY OF WASHINGTON; sociocultural anthropology, museology, material culture, cultural heritage, Micronesia, North America
OPPERMAN, HAL N; PhD, 1972, UNIVERSITY OF CHICAGO; seventeenth-and eighteenth-century European art
OZUBKO, CHRISTOPHER; MFA, 1981, CRANBROOK ACADEMY OF ART; visual communication design
SMITH, CHARLES W; MFA, 1956, CRANBROOK ACADEMY OF ART; sculpture
SPAFFORD, MICHAEL C; MA, 1960, HARVARD UNIVERSITY; painting, drawing
TAYLOR, NORMAN J; MA, 1967, UNIVERSITY OF IOWA; MFA, 1967, UNIVERSITY OF IOWA; sculpture
WADDEN, DOUGLAS J; MFA, 1970, YALE UNIVERSITY; graphic design, photography
WALKER, JAMIE; MFA, 1983, RHODE ISLAND SCHOOL OF DESIGN; ceramic arts
WARASHINA, M PATRICIA; MFA, 1964, UNIVERSITY OF WASHINGTON; ceramics
WHITEHILL-WARD, JOHN; MS, 1974, ILLINOIS INSTITUTE OF TECHNOLOGY; graphic design
WRIGHT, ROBIN K; PhD, 1985, UNIVERSITY OF WASHINGTON; Native American art, Native art of the Pacific Northwest Coast, Haida art

Associate Professor

GALE, ANN E; MFA, 1991, YALE UNIVERSITY; studio painting and drawing
GARVENS, ELLEN J.; MA, 1983, UNIVERSITY OF NEW MEXICO; mixed media photographic works combining flat images with sculptural materials
GARVENS, ELLEN J.; MFA, 1987, UNIVERSITY OF NEW MEXICO; mixed media photographic works combining flat images with sculptural materials
JECK, DOUGLAS A.; MFA, 1989, THE SCHOOL OF ART INSTITUTE OF CHICAGO; figurative ceramics
KOENIG, HAZEL L; MFA, 1950, UNIVERSITY OF WASHINGTON; fiber arts
LABITZKE, CURT W; MFA, 1984, UNIVERSITY OF NOTRE DAME; printmaking: intaglio and lithography emphasizing hand-drawn techniques
PRACZUKOWSKI, EDWARD; MFA, 1965, CRANBROOK ACADEMY OF ART; painting, drawing
PROCTOR, RICHARD M; MA, 1962, MICHIGAN STATE UNIVERSITY; fiber arts

WELMAN, VALENTINE S; MFA, 1954, UNIVERSITY OF COLORADO (BOULDER); painting, drawing

Asian Languages and Literatures

Professor

COX, COLLETT D.; PhD, 1983, COLUMBIA UNIVERSITY; Buddhist studies (East and South Asian), Indian philosophy and religion, comparative religion
GETHING, THOMAS W.; PhD, 1966, UNIVERSITY OF MICHIGAN; Thai and Lao language and linguistics
NORMAN, JERRY; PhD, 0, UNIVERSITY OF CALIFORNIA (BERKELEY); Chinese language and linguistics, Altaic linguistics.
SALOMON, RICHARD G.; PhD, 1975, UNIVERSITY OF PENNSYLVANIA; Sanskrit language and literature, Buddhist studies

Associate Professor

BRANDAUER, FREDERICK P; PhD, 1973, STANFORD UNIVERSITY; traditional Chinese vernacular fiction and modern Chinese literature
COOKE, JOSEPH R; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); Thai language and literature.
KANO, TAMAKO-NIWA; PhD, 1956, RADCLIFFE; Japanese language

Lecturer

KIM, SOOHEE; PhD, 1999, UNIVERSITY OF WASHINGTON; Korean language, morphology, phonology-phonetics interface, and historical linguistics
NGUYEN, KIM O; PhD, 1973, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Vietnamese language and literature
OHTA, KAORU; PhD, 1994, UNIVERSITY OF CALIFORNIA (LOS ANGELES); syntax, morphology, Japanese linguistics, language acquisition, and Japanese pedagogy
SINGH, KUNWAR P; PhD, 2000, UNIVERSITY OF WISCONSIN; Hindi language

Astronomy

Professor

ANDERSON, SCOTT; PhD, 1985, UNIVERSITY OF WASHINGTON; quasars and active galaxies, x-ray astronomy
BALICK, BRUCE; PhD, 1971, CORNELL UNIVERSITY; radio astronomy, ionized nebulae, peculiar galaxies.

BOHM, KARL-HEINZ; PhD, 1954, UNIVERSITY OF KIEL (GERMANY); stellar atmospheres, magnetic stars
 BOHM-VITENSE, ERIKA H; PhD, 1951, UNIVERSITY OF KIEL (GERMANY); stellar atmospheres, magnetic stars.
 BROWNLEE, DONALD E; PhD, 1971, UNIVERSITY OF WASHINGTON; origin of the solar system, comets, interplanetary dust.
 HAWLEY, SUZANNE; PhD, 1989, UNIVERSITY OF TEXAS (AUSTIN); Variable stars, magnetic activity, flares, galactic structure, dwarf galaxies.
 HAXTON, WICK C.; PhD, 1976, STANFORD UNIVERSITY; theoretical physics, nuclear physics
 HOGAN, CRAIG J.; PhD, 1980, CAMBRIDGE UNIVERSITY (UK); astrophysical cosmology, especially the origin of astronomical structures in the expanding universe
 QUINN, THOMAS R.; PhD, 1986, PRINCETON UNIVERSITY; Solar System dynamics and galaxy formation
 SULLIVAN, WOODRUFF T; PhD, 1971, UNIVERSITY OF MARYLAND; radio astronomy, galactic and extragalactic structure, history of astronomy
 SZKODY, PAULA; PhD, 1975, UNIVERSITY OF WASHINGTON; cataclysmic variables, photometry, spectroscopy
 WALLERSTEIN, GEORGE; PhD, 1958, CALIFORNIA INSTITUTE OF TECHNOLOGY; chemical composition of stars, peculiar stars, interstellar matter

Associate Professor

DALCANTON, JULIANNE; PhD, 1995, PRINCETON UNIVERSITY; The evolution and formation of galaxies.

Assistant Professor

AGOL, ERIC; PhD, 1997, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); Black holes, accretion disks, quasars, gravitational lensing, planetary transits, dark matter.

Atmospheric Sciences

Professor

BADGLEY, FRANKLIN; PhD, 1951, NEW YORK UNIVERSITY; turbulence
 BAKER, MARCIA; PhD, 1971, UNIVERSITY OF WASHINGTON; cloud physics, atmospheric geophysics
 BATTISTI, DAVID S; PhD, 1988, UNIVERSITY OF WASHINGTON; large-scale atmosphere-ocean dynamics, climate dynamics, tropical circulation, polar climates
 BREIDENTHAL, ROBERT E; PhD, 1979, CALIFORNIA INSTITUTE OF TECHNOLOGY; turbulence, entrainment, mixing, vorticity

BRETHERTON, CHRISTOPHER S.; PhD, 1984, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; convective cloud systems, boundary layer meteorology, numerical modeling, tropical meteorology
 BUSINGER, JOOST A; PhD, 1954, UNIVERSITY OF UTRECHT (NETHERLANDS); energy transfer.
 CHARLSON, ROBERT J; PhD, 1964, UNIVERSITY OF WASHINGTON; atmospheric chemistry
 DURRAN, DALE R; PhD, 1981, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; atmospheric dynamics and modeling, numerical methods, mountain meteorology, mesoscale meteorology
 FLEAGLE, ROBERT G; PhD, 1949, NEW YORK UNIVERSITY; physical and dynamic meteorology, weather modification and public policy, air-sea interaction process
 GAMMON, RICHARD H; PhD, 1970, HARVARD UNIVERSITY; atmospheric chemistry, chemical oceanography, environmental chemistry; biogeochemical cycles, global
 HARTMANN, DENNIS L; PhD, 1975, PRINCETON UNIVERSITY; climate change, dynamic meteorology, radiation and remote sensing
 HOUZE, ROBERT A.; PhD, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; mesoscale meteorology, cloud physics and dynamics, tropical and mountain meteorology
 JAFFE, DANIEL A; PhD, 1987, UNIVERSITY OF WASHINGTON; atmospheric chemistry, urban and global air pollution, environmental education
 LACHAPPELLE, EDWARD; DSc, 1967, UNIVERSITY OF PUGET SOUND; snow-ice physics
 LEOVY, CONWAY B; PhD, 1964, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; climatic role of clouds, planetary atmospheres, astrobiology, atmospheric circulation and dynamics
 MASS, CLIFFORD F; PhD, 1978, UNIVERSITY OF WASHINGTON; synoptic and mesoscale meteorology.
 OVERLAND, JAMES E; PhD, 1973, NEW YORK UNIVERSITY; Arctic and North Pacific climate variability, sea ice
 PLANT, WILLIAM J.; PhD, 1972, PURDUE UNIVERSITY; microwave remote sensing of the sea surface, atmosphere-ocean interaction
 RADKE, LAWRENCE F.; PhD, 1968, UNIVERSITY OF WASHINGTON; cloud and aerosol physics, wildfire science, remote sensing, airborne instrumentation
 REED, RICHARD J; DSc, 1949, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; weather analysis and prediction, numerical modeling
 ROE, GERARD H; PhD, 1999, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; Interaction/feedback of Earth

System components, Climate Dynamics, Paleoclimate, Surface Processes
 SARACHIK, EDWARD; PhD, 1966, BRANDEIS UNIVERSITY; atmospheric dynamics, air-sea interactions, greenhouse warming, equatorial dynamics, climate change
 TUNG, KA KIT; PhD, 1977, HARVARD UNIVERSITY; atmospheric and geophysical fluid dynamics
 UNTERSTEINER, NORBERT; PhD, 1950, UNIVERSITY OF INNSBRUCK (AUSTRIA); air-sea-ice interaction, polar climatology, sea ice physics
 WALLACE, JOHN M; PhD, 1966, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; atmospheric general circulation, climate variability, global warming

Research Professor

COVERT, DAVID S; PhD, 1974, UNIVERSITY OF WASHINGTON; atmospheric chemistry; aerosol physics, chemistry, optics, and instrumentation
 GRENFELL, THOMAS C; PhD, 1972, UNIVERSITY OF WASHINGTON; atmospheric radiation, radiative transfer, microwave remote sensing, ice and snow optics
 HEGG, DEAN A; PhD, 1979, UNIVERSITY OF WASHINGTON; atmospheric chemistry, cloud physics

Associate Professor

ALEXANDER, M. JOAN; PhD, 1992, UNIVERSITY OF COLORADO (BOULDER); stratospheric data analysis, mesoscale correction modeling, spectral analysis, gravity wave dynamics
 BATES, TIMOTHY S; PhD, 1988, UNIVERSITY OF WASHINGTON; oceanic and atmospheric chemistry, atmosphere-ocean interaction, aerosols and climate
 BOND, NICHOLAS A; PhD, 1986, UNIVERSITY OF WASHINGTON; air-sea interaction, boundary layers, coastal and marine meteorology
 CHEN, SHUYI S; PhD, 1990, PENNSYLVANIA STATE UNIVERSITY; tropical meteorology, air-sea interactions, mesoscale dynamics, numerical modeling
 FU, QIANG; PhD, 1991, UNIVERSITY OF UTAH; atmospheric radiation; cloud/aerosol/radiation/climate interactions; remote sensing
 HAKIM, GREGORY J; PhD, 1997, STATE UNIVERSITY OF NEW YORK (ALBANY); synoptic and mesoscale meteorology; atmospheric dynamics; rotating, stratified turbulence
 HARRISON, HALSTEAD; PhD, 1960, STANFORD UNIVERSITY; atmospheric chemistry, dispersion modeling, radiative transfer
 ROTHROCK, DAVID A; PhD, 1969, CAMBRIDGE UNIVERSITY (UK); physical oceanography, polar oceanography, polar ice remote sensing and modeling

Research Associate Professor

SMULL, BRADLEY F; PhD, 1986, UNIVERSITY OF WASHINGTON; mesoscale and radar meteorology, severe storms, large-scale atmosphere-ocean interactions

Assistant Professor

THORNTON, JOEL A.; PhD, 2002, UNIVERSITY OF CALIFORNIA (BERKELEY); Atmospheric chemistry, air pollution, climate change.
YUTER, SANDRA ELLYN; PhD, 1996, UNIVERSITY OF WASHINGTON; physical meteorology, mesoscale meteorology, radar and remote sensing

Research Assistant Professor

ANDERSON, THEODORE L.; PhD, 1992, UNIVERSITY OF WASHINGTON; atmospheric aerosol particles, measurement methods, and global climate change
WOOD, ROBERT; PhD, 1997, UNIVERSITY OF MANCHESTER (UK); cloud physics, boundary layer meteorology, cloud-climate interactions

Biology

Professor

AMMIRATI, JOSEPH F; PhD, 1972, UNIVERSITY OF MICHIGAN; mycology, taxonomy and ecology of fungi
BLISS, LAWRENCE C; PhD, 1956, DUKE UNIVERSITY; physiological plant ecology and ecosystem development and function, arctic, alpine environments
BOERSMA, P DEE; PhD, 1974, OHIO STATE UNIVERSITY; population, ecology
BRADSHAW, HARVEY D; PhD, 1984, LOUISIANA STATE UNIVERSITY; molecular genetics of adaptive evolution in natural populations of plants and animals
CLELAND, ROBERT E.; PhD, 1957, CALIFORNIA INSTITUTE OF TECHNOLOGY; physiology of plant growth
CLONEY, RICHARD A; PhD, 1959, UNIVERSITY OF WASHINGTON; invertebrate embryology, histology, morphogenic movements, metamorphosis, biology of ascidians
DEL MORAL, ROGER; PhD, 1968, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); ecology, primary succession, gradient analysis, community structure
EDWARDS, JOHN S; PhD, 1960, CAMBRIDGE UNIVERSITY (UK); arthropod neurobiology, insect physiology and development, tundra and alpine biology
EDWARDS, SCOTT V.; PhD, 1992, UNIVERSITY OF CALIFORNIA

(BERKELEY); molecular evolution and population genetics; evolutionary history of birds
HALL, BENJAMIN D; PhD, 1959, HARVARD UNIVERSITY; the evolution of nuclear genes in plants and fungi
HALPERIN, WALTER; PhD, 1965, UNIVERSITY OF CONNECTICUT; plant physiology, plant morphology
HASKINS, EDWARD F; PhD, 1965, UNIVERSITY OF MINNESOTA; cell biology and ultrastructure of microorganisms, especially slime molds
HAUSCHKA, STEPHEN D; PhD, 1966, JOHNS HOPKINS UNIVERSITY; regulation of skeletal muscle differentiation, growth factor-receptor signaling mechanisms
HERRING, SUSAN W.; PhD, 1971, UNIVERSITY OF CHICAGO; vertebrate functional morphology, relations between muscular function and skull growth
HILLE, MERRILL B; PhD, 1965, ROCKEFELLER UNIVERSITY; developmental biology, gastrulation in sea urchin embryos, translational regulation during meiosis
KENAGY, GEORGE JAMES; PhD, 1972, UNIVERSITY OF CALIFORNIA (LOS ANGELES); ecophysiology and behavior, reproduction and life history, population biology, evolution, mammalogy
KIMELMAN, DAVID; PhD, 1985, HARVARD UNIVERSITY; molecular biology of early development in the frog, *Xenopus laevis*, and the fish, *Danio rerio*
KOHN, ALAN J; PhD, 1957, YALE UNIVERSITY; invertebrate zoology, ecology and functional morphology of marine invertebrates, especially mollusks
KOZLOFF, EUGENE N; PhD, 1950, UNIVERSITY OF CALIFORNIA (BERKELEY); biology of lower invertebrates, ciliates, orthonectids, turbellarians and kinorhynches
KRUCKEBERG, ARTHUR R; PhD, 1950, UNIVERSITY OF CALIFORNIA (BERKELEY); evolution, biosystematics, edaphic ecology
LEOPOLD, ESTELLA B; PhD, 1955, YALE UNIVERSITY; paleoecology, pollen and seed analysis, late Cenozoic environments and climate history
MOODY, WILLIAM J; PhD, 1977, STANFORD UNIVERSITY; single cell electrophysiology, development of electrical properties in embryos.
NESTER, EUGENE W; PhD, 1959, CASE WESTERN RESERVE UNIVERSITY; genetics and biochemistry, of bacterial-plant cell interactions
ORIANI, GORDON H; PhD, 1960, UNIVERSITY OF CALIFORNIA (BERKELEY); ecology and ethology, vertebrate social systems, community structure, plant-herbivore interactions.
PAINE, ROBERT T; PhD, 1961, UNIVERSITY OF MICHIGAN; experimental

ecology, organization and structure of marine communities
PALKA, JOHN M; PhD, 1965, UNIVERSITY OF CALIFORNIA (LOS ANGELES); neurophysiology, sensory physiology, developmental neurobiology
ROHWER, SIEVERT A; PhD, 1971, UNIVERSITY OF KANSAS; ecology and evolution of social behavior, deception and evolution of status-signaling systems, avian
STEINER, ROBERT A; PhD, 1975, UNIVERSITY OF OREGON; neuroendocrinology, neuroscience, endocrinology
TSUKADA, MATSUO; PhD, 1961, OSAKA CITY UNIVERSITY (JAPAN); interpretation of Quaternary events from palynological and kindred data
VAN VOLKENBURGH, ELIZABETH; PhD, 1980, UNIVERSITY OF WASHINGTON; leaf growth and development, photobiology and electrophysiology
WAALAND, J ROBERT; PhD, 1969, UNIVERSITY OF CALIFORNIA (BERKELEY); biology of marine algae
WALKER, RICHARD B; PhD, 1948, UNIVERSITY OF CALIFORNIA (BERKELEY); plant physiology, mineral nutrition, water relations
WHISLER, HOWARD C.; PhD, 1960, UNIVERSITY OF CALIFORNIA (BERKELEY); mycology, aquatic fungi, slime-molds and phycomycetes, development
WHITELEY, ARTHUR H; PhD, 1945, PRINCETON UNIVERSITY; comparative development and physiology of invertebrates, genetic control of development, fertilizati
YAO, MENG CHAO; PhD, 1975, UNIVERSITY OF ROCHESTER; regulation of gene amplification and chromosome rearrangements in *Tetrahymena*

Research Professor

DETHIER, MEGAN N; PhD, 1981, UNIVERSITY OF WASHINGTON; marine intertidal ecology, shoreline classification systems, plant-herbivore interactions
FOE, VICTORIA; PhD, 1975, UNIVERSITY OF TEXAS (AUSTIN); cell cycle control and morphogenesis in *Drosophila* embryos
GRAUBARD, KATHERINE; PhD, 1973, UNIVERSITY OF WASHINGTON; cellular neurophysiology, neural basis of behavior
WASSER, SAMUEL K.; PhD, 1981, UNIVERSITY OF WASHINGTON; behavioral ecology, endocrinology, conservation genetics and reproductive biology.

Associate Professor

BAKKEN, AIMEE; PhD, 1970, UNIVERSITY OF IOWA; developmental and cell biology, chromosome structure and function in oogenesis and embryogenesis, de

GRIFFITHS, W MARY; PhD, 1953, UNIVERSITY OF CALIFORNIA (BERKELEY); zoology.
PARKHURST, SUSAN M.; PhD, 1995, JOHNS HOPKINS UNIVERSITY; Developmental, Genetic, and Molecular Analysis of *Drosophila* embryogenesis.
PRIESS, JAMES R.; PhD, 1983, UNIVERSITY OF COLORADO (BOULDER); reliability models, fault trees
RAIBLE, DAVID W.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; zebrafish neural development
RUESINK, JENNIFER; PhD, 1996, UNIVERSITY OF WASHINGTON; Marine intertidal ecology, especially community dynamics, food webs, introduced species.
SWALLA, BILLIE J.; PhD, 1988, UNIVERSITY OF IOWA; How developmental and evolutionary processes influence animal body plans.
TORII, KEIKO; PhD, 1993, UNIVERSITY OF TSUKUBA (JAPAN); Arabidopsis developmental genetics; receptor-mediated signal transduction in higher plants

Research Associate Professor

MANDOLI, DINA F.; PhD, 1982, STANFORD UNIVERSITY; plant development and morphogenesis using genetics, molecular biology, physiology

Assistant Professor

DE LA IGLESIA, HORACIO O.; PhD, 1997, UNIVERSITY OF MASSACHUSETTS; Neural basis of Behavior. Biological clocks & biological rhythms. Stem cells and brain repair.

Lecturer

MARTIN-MORRIS, LINDA E.; PhD, 1991, BRANDEIS UNIVERSITY; genetics, nonmajors biology
NICOTRI, MARY E.; PhD, 1974, UNIVERSITY OF WASHINGTON; marine ecology, evolution and introductory biology
OCONNOR, EILEEN; MS, 1976, UNIVERSITY OF WASHINGTON; ecology and evolution
ZEMAN, LESLIE B.; DVM, 1975, MICHIGAN STATE UNIVERSITY; animal physiology

Chemistry

Professor

AEBERSOLD, RUDOLF HANS; MD, 1984, YALE UNIVERSITY; Protein biochemical investigation of signal transduction pathways.
ANDERSEN, NIELS H.; PhD, 1967, NORTHWESTERN UNIVERSITY; bioorganic, biophysical, and medicinal

chemistry, NMR spectroscopy
CALLIS, JAMES B.; PhD, 1970, UNIVERSITY OF WASHINGTON; instrumentation development, process analytical chemistry, non-invasive clinical chemistry
CAMPBELL, CHARLES T.; PhD, 1979, UNIVERSITY OF TEXAS (AUSTIN); physical chemistry of solid surfaces, chemisorption, catalysis, and surface analysis
CHRISTIAN, GARY D.; PhD, 1964, UNIVERSITY OF MARYLAND; atomic spectroscopy, clinical analysis, electroanalysis, flow injection analysis, optodes
DALTON, LARRY R.; PhD, 1971, HARVARD UNIVERSITY; materials chemistry focused on producing next generation opto-electronic materials
DROBNY, GARY P.; PhD, 1981, UNIVERSITY OF CALIFORNIA (BERKELEY); two-dimensional and multiple quantum studies in nuclear magnetic resonance
FLOSS, HEINZ G.; PhD, 1961, TECHNICAL UNIVERSITY OF MUNICH (GERMANY); bioorganic and natural products chemistry
GELB, MICHAEL H.; PhD, 1982, YALE UNIVERSITY; mechanistic enzymology, bioorganic and medicinal chemistry
GOLDBERG, KAREN; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); energetics and mechanisms of fundamental organometallic reactions
GOUTERMAN, MARTIN; PhD, 1958, UNIVERSITY OF CHICAGO; electronic structure, spectra and luminescence of porphyrins, use of porphyrins as sensors
GREGORY, NORMAN W.; PhD, 1943, OHIO STATE UNIVERSITY; structure and thermodynamic properties of inorganic substances, vaporization reactions
HALSEY, GEORGE D.; PhD, 1948, PRINCETON UNIVERSITY; absorption and interaction of rare gases with surfaces, solid solutions of rare gases, catalysis
HEINEKEY, DENNIS M.; PhD, 1982, UNIVERSITY OF ALBERTA (CANADA); organometallic chemistry of the transition metals
HOPKINS, PAUL B.; PhD, 1982, HARVARD UNIVERSITY; organic synthesis, bioorganic and nucleic acid chemistry
JONSSON, HANNES; PhD, 1985, UNIVERSITY OF CALIFORNIA (SAN DIEGO); computer simulations and scattering calculation in materials and surface science
KLEVIT, RACHEL E.; DPhil, 1981, OXFORD UNIVERSITY (UK); protein structure and function; molecular recognition; protein NMR
KOVACS, JULIA A.; PhD, 1986, HARVARD UNIVERSITY; synthesis, structure, and reactivity of biologically relevant transition-metal complexes
KOWALSKI, BRUCE; PhD, 1969,

UNIVERSITY OF WASHINGTON; analytical chemometrics, computerized instrumentation for process monitoring and control
KROHN, KENNETH A.; PhD, 1971, UNIVERSITY OF CALIFORNIA (DAVIS); chemistry, radiation oncology
KWIRAM, ALVIN L.; PhD, 1963, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular structure and dynamics in the solid state with emphasis on excited states, magnetic resonance
MAYER, JAMES M.; PhD, 1982, CALIFORNIA INSTITUTE OF TECHNOLOGY; inorganic, organometallic, and bioinorganic transition metal chemistry
MURRAY, JAMES W.; PhD, 1973, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; marine geochemistry, aquatic chemistry
OLMSTEAD, MARJORIE A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental condensed-matter physics, surface and interface physics
PARSON, WILLIAM W.; PhD, 1965, CASE WESTERN RESERVE UNIVERSITY; bioenergetics, with particular emphasis on photosynthesis, picosecond spectroscopy
POCKER, YESHAYAU; PhD, 1953, UNIVERSITY COLLEGE, LONDON (UK); organic reaction mechanisms, chemical and enzymatic catalysis, metalloenzymes, Alzheimer proteins
RABINOVITCH, B SEYMOUR; PhD, 1942, MCGILL UNIVERSITY (CANADA); chemical dynamics, energy relaxation, properties of silver surfaces
REID, PHILIP J.; PhD, 1992, UNIVERSITY OF CALIFORNIA (BERKELEY); ultrafast condensed phase chemical reaction dynamics
REINHARDT, WILLIAM P.; PhD, 1968, HARVARD UNIVERSITY; theoretical and computational chemistry with applications in thermodynamics and atomic physics
ROBINSON, BRUCE H.; PhD, 1975, VANDERBILT UNIVERSITY; magnetic resonance, molecular dynamics, polymer dynamics, nonlinear response theory
ROSE, NORMAN J.; PhD, 1960, UNIVERSITY OF ILLINOIS; design, synthesis, and study of coordination compounds of transition metals, including the lanthanid
RUZICKA, JAROMIR; PhD, 1963, TECHNICAL UNIVERSITY OF PRAGUE (CZECH); analysis via flow injection for clinical research and industrial applications
SCHUBERT, WOLFGANG M.; PhD, 1947, UNIVERSITY OF MINNESOTA; mechanism and steric course of organic reactions, substituent and solvent effects
STENKAMP, RONALD E.; PhD, 1975, UNIVERSITY OF WASHINGTON; crystallography, metalloproteins, protein engineering, blood clotting proteins

STUVE, ERIC M.; PhD, 1983, STANFORD UNIVERSITY; electrochemical surface science, fuel cell engineering
SYNOVEC, ROBERT E.; PhD, 1986, IOWA STATE UNIVERSITY; multidimensional chemical separation techniques, chemometric data analysis
VANDENBOSCH, ROBERT; PhD, 1957, UNIVERSITY OF CALIFORNIA (BERKELEY); nuclear studies, particularly fission and nuclear reaction mechanisms, molecular clusters
WOODMAN, DARRELL J.; PhD, 1965, HARVARD UNIVERSITY; peptide synthesis, heterocyclic compounds, computers in chemical education
XIA, YOUNAN; PhD, 1996, HARVARD UNIVERSITY; materials chemistry and nanotechnology
YAGER, PAUL; PhD, 1980, UNIVERSITY OF OREGON; physical chemistry, applications of biomembranes, biosensors, microfluidics, biomedical diagnostic i

Research Professor

BRODSKY, ANATOL M.; DSc, 1960, INSTITUTE OF CHEMICAL PHYSICS (RUSSIA); solid state physics, radiation chemistry and physics science.

Associate Professor

CRITTENDEN, ALDEN L.; PhD, 1947, UNIVERSITY OF ILLINOIS; mass spectra, solid electrode polarography
KELLER, SARAH L.; PhD, 1995, PRINCETON UNIVERSITY; biophysics; physical chemistry; soft condensed matter; surfactants; lipids; self-assembly
MACKLIN, JOHN W.; PhD, 1969, CORNELL UNIVERSITY; spectroscopic studies of materials in condensed phase and in solutions
PREZHDO, OLEG; PhD, 1997, UNIVERSITY OF TEXAS (AUSTIN); Excitation dynamics of condensed phase chemical systems.
SASAKI, TOMIKAZU; PhD, 1985, KYOTO UNIVERSITY (JAPAN); design and synthesis of functional proteins and protein mimetics

Assistant Professor

GAMELIN, DANIEL R.; PhD, 1997, STANFORD UNIVERSITY; physical inorganic chemistry; spectroscopy, bio- and materials-related inorganic chemistry
GINGER JR, DAVID S.; PhD, 2001, UNIVERSITY OF CAMBRIDGE (UK); optical and electronic properties of organic and nanoscale materials, bioinspired materials

Lecturer

NYASULU, FRAZIER W.; PhD, 1985, UNIVERSITY OF SALFORD (UK); chemical education, electroanalytical chemistry, electro depositions

WIEGAND, DEBORAH H.; PhD, 1990, NORTHERN ILLINOIS UNIVERSITY; chemical education, electrochemistry on liquid/liquid interfaces

Classics

Professor

CLAUSS, JAMES J.; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); Latin poetry and prose, Hellenistic literature, Latin literature of the Empire
GOWING, ALAIN M.; PhD, 1988, BRYN MAWR COLLEGE; Latin and Greek historiography, Latin literature of the Empire
HALLERAN, MICHAEL R.; PhD, 1981, HARVARD UNIVERSITY; Greek literature, especially tragedy; Greek intellectual history
HARMON, DANIEL P.; PhD, 1968, NORTHWESTERN UNIVERSITY; Greek and Roman religion, Latin poetry, Greek tragedy, classical linguistics
MACKAY, PIERRE A.; PhD, 1964, UNIVERSITY OF CALIFORNIA (BERKELEY); Greek literature, post classical and Byzantine Greek literature, numismatics
PASCAL, PAUL; PhD, 1953, UNIVERSITY OF NORTH CAROLINA; Latin literature, Roman archaeology, medieval Latin.

Communication

Professor

BALDASTY, GERALD J.; PhD, 1978, UNIVERSITY OF WASHINGTON; communications history and law, government-press relations, First Amendment philosophy and theory
BOSMAJIAN, HAIG A.; PhD, 1960, STANFORD UNIVERSITY; rhetoric, freedom of speech.
CARTER, RICHARD FREMONT; PhD, 1957, UNIVERSITY OF WISCONSIN; communications theory, methodology, behavioral analysis
GIFFARD, CHARLES A.; PhD, 1968, UNIVERSITY OF WASHINGTON; international news systems, news flow, editing and reporting
LANG, GLADYS ENGEL; PhD, 1954, UNIVERSITY OF CHICAGO; political effects of mass media, sociology of art, political movements and crowd behavior.
LANG, KURT; PhD, 1953, UNIVERSITY OF CHICAGO; political and social effects of the media on mass communication; arts and society; public opinion
PEMBER, DON R.; PhD, 1969, UNIVERSITY OF WISCONSIN; contemporary law and mass communication, First Amendment history, regulation of mass communication

PHILIPSEN, GERRY F.; PhD, 1972, NORTHWESTERN UNIVERSITY; ethnography of communication.
SCHEIDEL, THOMAS; PhD, 1958, UNIVERSITY OF WASHINGTON; communication theory and research, small group processes
STAMM, KEITH R.; PhD, 1968, UNIVERSITY OF WISCONSIN; communities and newspapers, new media technology, dynamic models of communication behavior.
WARNICK, BARBARA P.; PhD, 1977, UNIVERSITY OF MICHIGAN; rhetorical theory and criticism.
YERXA, FENDALL WINSTON; BA, 1936, HAMILTON COLLEGE; journalism

Associate Professor

BOWEN, LAWRENCE; PhD, 1974, UNIVERSITY OF WISCONSIN; advertising, media research, consumer information-seeking and -processing behaviors
BOWES, JOHN E.; PhD, 1971, MICHIGAN STATE UNIVERSITY; man-machine communication, public opinion, international communication.
CECCARELLI, LEAH M.; PhD, 1995, NORTHWESTERN UNIVERSITY; rhetoric of science, rhetorical criticism
CRANSTON, PATRICIA; MA, 1954, UNIVERSITY OF TEXAS (AUSTIN); broadcast journalism, history, writing and production of docudramas
FEARN-BANKS, KATHLEEN A.; MS, 1965, UNIVERSITY OF CALIFORNIA (LOS ANGELES); crisis communications, history
JACKSON, KENNETH M.; PhD, 1970, UNIVERSITY OF WASHINGTON; institutional communications, media research, mass media and public policy, cultural communications
MOY, PATRICIA; PhD, 1998, UNIVERSITY OF WASHINGTON; political communication, public opinion, media effects and research methodology
PARKS, MALCOLM R.; PhD, 1976, MICHIGAN STATE UNIVERSITY; communication theory, interpersonal communication, social uses of the Internet, social network and o
POST, ROBERT M.; PhD, 1961, OHIO UNIVERSITY; oral interpretation of literature.
SAMUELSON, MERRILL; PhD, 1960, STANFORD UNIVERSITY; research methods, processes of reading, patterns in reader selection of new stories.
SIMPSON, ROGER A.; PhD, 1973, UNIVERSITY OF WASHINGTON; communication history, law of communication, media economics, editorial journalism
UNDERWOOD, DOUGLAS M.; MA, 1974, OHIO STATE UNIVERSITY; newspaper economics and management, press and politics, literature and journalism

Assistant Professor

THURLOW, CRISPIN SIMON; PhD, 2001, CARDIFF UNIVERSITY, WALES; communication in adolescence; language and new technologies; intercultural communication and tourism

Lecturer

GILL, KATHY E; MS, 1979, VIRGINIA POLYTECHNIC INST & STATE UNIV; digital media - technology, usability, effectiveness
NYQUIST, JODY D; MA, 1967, UNIVERSITY OF WASHINGTON; communication occurring in higher education and/or business/industry training units.

Comparative Literature

Professor

ADAMS, HAZARD S; PhD, 1953, UNIVERSITY OF WASHINGTON; romanticism, history of literary theory, Anglo-Irish literature
CHRISTOFIDES, C G; PhD, 1956, UNIVERSITY OF MICHIGAN; medieval, seventeenth century, Romanesque
HRUBY, ANTONIN F; PhD, 1946, CHARLES UNIVERSITY (CZECHOSLOVAKIA); medieval literature
KRAMER, KARL D; PhD, 1964, UNIVERSITY OF WASHINGTON; Russian literature
LEINER, JACQUELINE; Docteur es Lettres, 1969, UNIVERSITY OF STRASBOURG (FRANCE); modern French literature.
REINERT, OTTO; PhD, 1952, YALE UNIVERSITY; comparative literature, eighteenth-century literature
STEELE, CYNTHIA; PhD, 1980, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Latin American literature and society, cinema, postcolonial and feminist theory
STEENE, BIRGITTA; PhD, 1960, UNIVERSITY OF WASHINGTON; Scandinavian drama and film, children's literature, comparative literature
VANCE, EUGENE; PhD, 1964, CORNELL UNIVERSITY; medieval literature, the history of criticism, and discourse analysis
ZIADEH, FARHAT J; LLB, 1940, UNIVERSITY OF LONDON (UK); Arabic language and literature, Islamic law, Islamic institutions

Associate Professor

ELLRICH, ROBERT J; PhD, 1960, HARVARD UNIVERSITY; eighteenth-century French literature
KOGOJ-KAPETANIC, BREDA; LITTD, 1966, UNIVERSITY OF ZAGREB (YUGOSLAVIA); theory of comparative literature, 19th and 20th century European literature

MC LEAN, SAMMY K; PhD, 1963, UNIVERSITY OF MICHIGAN; Western drama, 20th-c poetry, psychoanalysis and literature, literary translation
SEHMSDORF, HENNING K; PhD, 1968, UNIVERSITY OF CHICAGO; folklore and mythology, Norwegian language and literature, comparative literature.
WARME, LARS G; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); Swedish language and literature, Scandinavian novel, comparative literature.

Dance

Professor

BORIS, RUTHANNA; ballet technique and dance therapy.
KNAPP, JOAN S; MA, 1964, UNIVERSITY OF ILLINOIS; dance composition, improvisation, kinesthetic training.
WILEY, HANNAH; MA, 1981, NEW YORK UNIVERSITY; ballet, scientific aspects of dance, choreography, dance in higher education

Drama

Professor

CLAY, JACK D.; MA, 1956, NORTHWESTERN UNIVERSITY; acting
COMTOIS, MARY ELIZABETH; PhD, 1970, UNIVERSITY OF COLORADO (BOULDER); playwriting
CRIDER, JAMES R; MA, 1950, UNIVERSITY OF WASHINGTON; costume design
SYDOW, JOHN D; MFA, 1950, YALE UNIVERSITY; directing

Associate Professor

CURTIS-NEWTON, VALERIE; MA, 1996, UNIVERSITY OF WASHINGTON; theatrical production, theatre technique, theatre history
FORRESTER, WILLIAM D; MFA, 1969, YALE UNIVERSITY; scene design
JENKINS, MARK F.; , O, ; the Stanislavski approach to acting; acting, directing
JOHNSON, DAVID ODAI; PhD, 1994, UNIVERSITY OF TEXAS (AUSTIN); theatre history with an area of emphasis in English Restoration and 18th century
PARKER, SHANGA KYLE GERARD; MFA, 1991, UNIVERSITY OF CALIFORNIA (SAN DIEGO); acting in Shakespearean verse
VALENTINETTI, AURORA; MA, 1949, UNIVERSITY OF WASHINGTON; puppetry

Assistant Professor

MADDEN, CATHERINE M; MA, 1977, WASHINGTON UNIVERSITY; Alexander technique, acting
WOLCOTT, JOHN R; PhD, 1967, OHIO STATE UNIVERSITY; theatre history, computing in theatre research

Lecturer

COLLUM, JERRY L; BFA, 1984, AUBURN UNIVERSITY; technical theatre
SHAHN, JUDITH; BFA, 1977, CARNEGIE MELLON UNIVERSITY; voice production for the theatre, dialects, Shakespeare and modern text
TROUT, DEBORAH L; MFA, 1994, YALE UNIVERSITY; design for the theatre; costume and set design

Earth and Space Sciences

Professor

ADAMS, JOHN B; PhD, 1961, UNIVERSITY OF WASHINGTON; remote sensing, planetary geology
ATWATER, BRIAN F; PhD, 1980, UNIVERSITY OF DELAWARE; Quaternary geology, earthquake hazards.
BAKER, MARCIA; PhD, 1971, UNIVERSITY OF WASHINGTON; cloud physics, atmospheric geophysics
BERGANTZ, GEORGE W; PhD, 1988, JOHNS HOPKINS UNIVERSITY; volcanology, surface processes, physical petrology
BOOKER, JOHN R; PhD, 1968, UNIVERSITY OF CALIFORNIA (SAN DIEGO); magnetotellurics, tectonics, inverse theory
BROWN, J. MICHAEL; PhD, 1980, UNIVERSITY OF MINNESOTA; experimental and theoretical mineral and rock physics
BROWNLIE, DONALD E; PhD, 1971, UNIVERSITY OF WASHINGTON; origin of the solar system, comets, interplanetary dust.
BUSINGER, JOOST A; PhD, 1954, UNIVERSITY OF UTRECHT (NETHERLANDS); energy transfer.
CHARLSON, ROBERT J; PhD, 1964, UNIVERSITY OF WASHINGTON; atmospheric chemistry
CHENEY, ERIC S.; PhD, 1964, YALE UNIVERSITY; economic and regional geology, sequence stratigraphy
CLARK, KENNETH C; PhD, 1947, HARVARD UNIVERSITY; optical spectroscopy, upper atmosphere
COWAN, DARREL S; PhD, 1972, STANFORD UNIVERSITY; structural geology, regional tectonics
CREAGER, JOE S; PhD, 1958, TEXAS A&M UNIVERSITY; geological oceanography, sedimentology
CREAGER, KENNETH C; PhD, 1984, UNIVERSITY OF CALIFORNIA (SAN

DIEGO); seismology, geophysical inverse theory
CROSSON, ROBERT S; PhD, 1966, STANFORD UNIVERSITY; seismology, earth structure, tectonics, earthquake hazards
DELANEY, JOHN R.; PhD, 1977, UNIVERSITY OF ARIZONA; geological oceanography, origin of oceanic crust, igneous petrology
EVANS, BERNARD W; PhD, 1959, OXFORD UNIVERSITY (UK); mineralogy, metamorphic petrology
GHOSE, SUBRATA; PhD, 1959, UNIVERSITY OF CHICAGO; mineral physics, crystallography, mineralogy
GILLESPIE, ALAN R.; PhD, 1982, CALIFORNIA INSTITUTE OF TECHNOLOGY; Quaternary geology, glacial geomorphology, remote sensing
HALLET, BERNARD; PhD, 1975, UNIVERSITY OF CALIFORNIA (LOS ANGELES); glacial and periglacial geomorphology (alpine and Arctic)
HOLZWORTH, ROBERT; PhD, 1977, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms
IVERSON, RICHARD M; PhD, 1984, STANFORD UNIVERSITY; volcano hazards, landslides, debris flows, lahars, geomechanics
JOHNSON, HARLAN PAUL; PhD, 1972, UNIVERSITY OF WASHINGTON; paleomagnetism and marine geophysics
LACHAPPELLE, EDWARD; DSc, 1967, UNIVERSITY OF PUGET SOUND; snow-ice physics
LEOVY, CONWAY B; PhD, 1964, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; climatic role of clouds, planetary atmospheres, astrobiology, atmospheric circulation and dynamics
MC CALLUM, IAN S; PhD, 1968, UNIVERSITY OF CHICAGO; lunar science, physics of meteorites, petrology
MERRILL, RONALD T; PhD, 1967, UNIVERSITY OF CALIFORNIA (BERKELEY); geomagnetism, paleomagnetism
MONTGOMERY, DAVID R; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); geomorphology (fluvial and hillslope)
NEWHALL, CHRISTOPHER; PhD, 1980, DARTMOUTH COLLEGE; volcanic processes, eruption forecasting
PARKS, GEORGE K; PhD, 1966, UNIVERSITY OF CALIFORNIA (BERKELEY); magnetospheric and space plasma physics.
PORTER, STEPHEN C; PhD, 1962, YALE UNIVERSITY; Quaternary stratigraphy, geochronology, paleoclimatology
RAYMOND, CHARLES F; PhD, 1969, CALIFORNIA INSTITUTE OF TECHNOLOGY; glaciology, ice sheet dynamics
RENSBERGER, JOHN M; PhD, 1967, UNIVERSITY OF CALIFORNIA

(BERKELEY); vertebrate paleontology and evolution
SACK, RICHARD O; PhD, 1979, HARVARD UNIVERSITY; petrology, thermochemistry of rock-forming minerals, chemical transport
SAHR, JOHN D.; PhD, 1990, CORNELL UNIVERSITY; radar remote sensing, ionospheric physics; signal processing; wireless communications
SMITH, STEWART W; PhD, 1961, CALIFORNIA INSTITUTE OF TECHNOLOGY; earthquake processes
STUIVER, MINZE; PhD, 1958, UNIVERSITY OF GRONINGEN (NETHERLANDS); geochronology, isotope geology
SWANSON, DONALD A; PhD, 1964, JOHNS HOPKINS UNIVERSITY; volcanology, regional geology
UNTERSTEINER, NORBERT; PhD, 1950, UNIVERSITY OF INNSBRUCK (AUSTRIA); air-sea-ice interaction, polar climatology, sea ice physics
WADDINGTON, EDWIN D; PhD, 1981, UNIVERSITY OF BRITISH COLUMBIA (CANADA); glacier and ice sheet dynamics, paleoclimatology
WARD, PETER D.; PhD, 1976, McMASTER UNIVERSITY (CANADA); paleontology, paleobiology, regional coastal stratigraphy
WASHBURN, ALBERT L; PhD, 1942, YALE UNIVERSITY; geomorphology, periglacial processes and environments.
WHIPPLE, ELDEN C; PhD, 1965, GEORGE WASHINGTON UNIVERSITY; magnetospheric physics, spacecraft-plasma interactions, kinetic theory of plasmas
WINGLEE, ROBERT M; PhD, 1984, UNIVERSITY OF SYDNEY (AUSTRALIA); space plasma physics, numerical simulation of space plasmas

Research Professor

ANDERSON, PATRICIA M; PhD, 1982, BROWN UNIVERSITY; paleoecology, paleoclimatology, Quaternary environments (Arctic)
BOOTH, DEREK B; PhD, 1984, UNIVERSITY OF WASHINGTON; Environmental geology, particularly human influences on hillslopes, runoff, and rivers.
CONWAY, HOWARD B; PhD, 1986, UNIVERSITY OF CANTERBURY (NEW ZEALAND); glacier and ice sheet history, snow avalanches
HERNANDEZ, GONZALO; PhD, 1962, UNIVERSITY OF ROCHESTER; aeronomy, optics
MALONE, STEPHEN; PhD, 1972, UNIVERSITY OF NEVADA; seismicity of Cascade volcanoes and eastern Washington, computers in seismic network analysis
WINEBRENNER, DALE P.; PhD, 1985, UNIVERSITY OF WASHINGTON; optical and radiowave propagation and scattering, remote sensing of planetary surfaces and subsurfaces

Associate Professor

STEIG, ERIC J; PhD, 1996, UNIVERSITY OF WASHINGTON; stable and cosmogenic isotope geochemistry, glaciology
STONE, JOHN O.H.; PhD, 1986, CAMBRIDGE UNIVERSITY (UK); cosmogenic isotope geochemistry
WILCOCK, WILLIAM S D; PhD, 1992, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics
WILLETT, SEAN D.; PhD, 1988, UNIVERSITY OF UTAH; geodynamics, earthquake hazards, modelling

Research Associate Professor

ABRAMSON, EVAN H.; PhD, 1985, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; The thermodynamic and transport properties of materials at extreme pressures.
ELY, JOHN T; PhD, 1969, UNIVERSITY OF WASHINGTON; background radiation as part of the geophysical environment
KRESS, VICTOR C; PhD, 1990, UNIVERSITY OF CALIFORNIA (BERKELEY); igneous petrology, physics/chemistry of volcanoes
MC CARTHY, MICHAEL P; PhD, 1988, UNIVERSITY OF WASHINGTON; solar wind and magnetospheric physics
MERCER, JAMES A; PhD, 1983, UNIVERSITY OF WASHINGTON; ocean acoustic tomography, global climate measurements, and ocean dynamic modeling
ODOM, ROBERT I.; PhD, 1980, UNIVERSITY OF WASHINGTON; Theoretical seismology; ocean acoustic tomography; wave propagation and scattering
SWANSON, BRIAN; PhD, 1992, UNIVERSITY OF WASHINGTON; atmospheric geophysics, cloud physics, physics of ice

Assistant Professor

CLADOUHOS, TRENTON T; PhD, 1993, CORNELL UNIVERSITY; structural geology, hydrogeology of fractured rocks
COOPER, KARI MELISSA; PhD, 2001, CALIFORNIA INSTITUTE OF TECHNOLOGY; Isotope geochemistry of volcanic rocks, timescales of magmatic processes, mantle geochemistry
COOPER, KARI MELISSA; PhD, 2001, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Isotope geochemistry of volcanic rocks, timescales of magmatic processes, mantle geochemistry
DAVIES-VOLLUM, SIAN; DPhil, 1993, OXFORD UNIVERSITY (UK); MSC, 1990, UNIVERSITY OF LONDON (UK); Sedimentological research, paleoenvironmental&paleobotanical reconstruction-ancient river syst/floodplains
DECOSMO, JANICE M; PhD, 1991, UNIVERSITY OF WASHINGTON; atmosphere-ocean interaction, boundary layer processes, science education,

educational technology
HARRIS, WALTER M; PhD, 1993,
UNIVERSITY OF MICHIGAN; Remote
Sensing of planet-satellite upper
atmospheres and their response to the
Sun and Solar Wind.
NESBITT, ELIZABETH A.; PhD, 1982,
UNIVERSITY OF CALIFORNIA
(BERKELEY); Paleoenvironments and
stratigraphy of the Pacific Northwest of
Tertiary rocks
ROE, GERARD H; PhD, 1999, MASSA-
CHUSETTS INSTITUTE OF TECHNOL-
OGY; Interaction/feedback of Earth
System components, Climate Dynamics,
Paleoclimate, Surface Processes

Research Assistant Professor

PUTKONEN, JAAKKO K; PhD, 1997,
UNIVERSITY OF WASHINGTON;
Quaternary geology, frozen ground
research, cosmogenic isotope dating

Lecturer

CHERNICOFF, STANLEY E; PhD, 1980,
UNIVERSITY OF MINNESOTA;
geomorphology.
SWANSON, TERRY W; PhD, 1994,
UNIVERSITY OF WASHINGTON;
Quaternary geology, geochronology

Economics

Professor

BROWN, GARDNER; PhD, 1964,
UNIVERSITY OF CALIFORNIA
(BERKELEY); resource economics
BRUCE, NEIL; PhD, 1975, UNIVERSITY
OF CHICAGO; public finance (econom-
ics of the public sector), especially
taxation
CRUTCHFIELD, JAMES A; PhD, 1954,
UNIVERSITY OF CALIFORNIA
(BERKELEY); natural resources
economics, policy and management,
especially marine and environmental
resources
HALVORSEN, ROBERT F; PhD, 1973,
HARVARD UNIVERSITY; natural
resource economics
HARTMAN, RICHARD C; PhD, 1971,
UNIVERSITY OF CALIFORNIA
(BERKELEY); economic theory
LUNDBERG, SHELLY J; PhD, 1981,
NORTHWESTERN UNIVERSITY; labor
economics
MAH, FENG-HWA; PhD, 1959, UNIVER-
SITY OF MICHIGAN; Chinese economy
and foreign trade.
MC CAFFREE, KENNETH M; PhD, 1950,
UNIVERSITY OF CHICAGO; labor
economics and the economics of
medicine
MC GEE, JOHN S; PhD, 1952,
VANDERBILT UNIVERSITY; industrial
organization
MORRIS, MORRIS D; PhD, 1954,

UNIVERSITY OF CALIFORNIA
(BERKELEY); economic history and the
economy of India
NELSON, CHARLES R; PhD, 1969,
UNIVERSITY OF WISCONSIN; time
series analysis, economic statistical
analysis, advanced macroeconomic
theory
NORTH, DOUGLAS C; PhD, 1952,
UNIVERSITY OF CALIFORNIA
(BERKELEY); economic history
PARKS, RICHARD; PhD, 1966, UNIVER-
SITY OF CALIFORNIA (BERKELEY);
econometrics
STARTZ, RICHARD; PhD, 1978, MASSA-
CHUSETTS INSTITUTE OF TECHNOL-
OGY; macroeconomics, econometrics,
finance, economics of tace
TURNOVSKY, STEPHEN J; PhD, 1968,
HARVARD UNIVERSITY; monetary and
macroeconomics, international econom-
ics, theory of economic stabilization

Associate Professor

EICHER, THEO S.; PhD, 1994, COLUM-
BIA UNIVERSITY; international,
development, and macroeconomics, with
emphasis on economic growth
KHALIL, FAHAD A.; PhD, 1991, VIRGINIA
POLYTECHNIC INST & STATE UNIV;
information economics and the theory of
contracts
LAWARREE, JACQUES P.; PhD, 1990,
UNIVERSITY OF CALIFORNIA
(BERKELEY); industrial organization,
contract theory, game theory

Assistant Professor

PORTNER, CLAUD C; PhD, 2001,
UNIVERSITY OF COPENHAGEN
(DENMARK); Household and Family
Economics; Economic Development;
Empirical Microeconomics; Labour
Economics

Lecturer

SALEHI-ESFAHANI, HAIDEH; PhD, 1985,
UNIVERSITY OF PENNSYLVANIA;
international economics, economic
development

English

Professor

ALEXANDER, EDWARD; PhD, 1963,
UNIVERSITY OF MINNESOTA;
Romantic and Victorian literature
ALLEN, CAROLYN; PhD, 1972, UNIVER-
SITY OF MINNESOTA; twentieth-century
literature, women writers, contemporary
critical theory
BURNS, WAYNE; PhD, 1946, CORNELL
UNIVERSITY; Victorian literature
COLDEWEY, JOHN C; PhD, 1972,
UNIVERSITY OF COLORADO (BOUL-
DER); medieval and Renaissance drama
and literature

DILLON, GEORGE L.; PhD, 1969,
UNIVERSITY OF CALIFORNIA
(BERKELEY); rhetoric, composition
FOWLER, DAVID C; PhD, 1949, UNIVER-
SITY OF CHICAGO; medieval literature,
comparative religion
FREY, CHARLES HUBBARD; PhD, 1971,
YALE UNIVERSITY; Renaissance
literature, Shakespeare
GERSTENBERGER, DONNA; PhD, 1958,
UNIVERSITY OF OKLAHOMA;
twentieth-century literature, Anglo-Irish
literature, feminist criticism
HANDWERK, GARY J; PhD, 1984,
BROWN UNIVERSITY; British, German,
and French nineteenth- and twentieth-
century narrative; Romantic and post-
Romantic
IRMSCHER, WILLIAM F; PhD, 1950,
INDIANA UNIVERSITY; rhetoric and
theory of composition
JOHNSON, CHARLES R; PhD, 1988,
STATE UNIV OF NEW YORK (STONY
BROOK); fiction writing
KENNEY, RICHARD L; BA, 1970,
DARTMOUTH COLLEGE; poetry writing
KORG, JACOB; PhD, 1952, COLUMBIA
UNIVERSITY; Victorian, twentieth-
century literature
MATCHETT, WILLIAM H; PhD, 1957,
HARVARD UNIVERSITY; Renaissance
literature, Shakespeare
MC CRACKEN, J DAVID; PhD, 1966,
UNIVERSITY OF CHICAGO; eighteenth-
century literature; Blake; Wordsworth;
biblical literature (esp. gospels,
parables)
REINERT, OTTO; PhD, 1952, YALE
UNIVERSITY; comparative literature,
eighteenth-century literature
RUSS, JOANNA; MFA, 1960, YALE
UNIVERSITY; fiction writing
SALE, ROGER H; PhD, 1957, CORNELL
UNIVERSITY; Renaissance literature
SHIELDS, DAVID; MFA, 1980, UNIVER-
SITY OF IOWA; creative nonfiction,
autobiography, fiction writing, contempo-
rary literature
SHULMAN, ROBERT; PhD, 1959, OHIO
STATE UNIVERSITY; American
literature
SILBERSTEIN, SANDRA V; PhD, 1982,
UNIVERSITY OF MICHIGAN; TESL,
critical theory, discourse analysis,
sociolinguistics, language and culture
SIMONSON, HAROLD P; PhD, 1958,
NORTHWESTERN UNIVERSITY;
American literature
STATEN, HENRY J.; PhD, 1978, UNIVER-
SITY OF TEXAS (AUSTIN); 19th- and
20th-century British literature, history of
literary criticism, contemporary theory
STEVICK, ROBERT D; PhD, 1956,
UNIVERSITY OF WISCONSIN;
medieval language and literature
WAGONER, DAVID R; MA, 1949, INDIANA
UNIVERSITY; twentieth-century
literature, fiction and poetry writing
WONG, SHAWN H; MA, 1974, SAN
FRANCISCO STATE; creative writing,
Chinese-American area studies

Associate Professor

- ABRAMS, ROBERT; PhD, 1973, INDIANA UNIVERSITY; American literature
- BAWARSHI, ANIS; PhD, 1999, UNIVERSITY OF KANSAS; rhetoric and composition studies, with an emphasis in genre theory, invention
- BRENNER, GERALD J.; PhD, 1969, UNIVERSITY OF NEW MEXICO; American literature, fiction writing
- BUTWIN, JOSEPH M.; PhD, 1971, HARVARD UNIVERSITY; Victorian literature
- CUMMINGS, KATHERINE; PhD, 1985, UNIVERSITY OF WISCONSIN; cultural studies, critical theory, queer studies, 20th.c americanist
- GRIFFITH, JOHN W.; PhD, 1969, UNIVERSITY OF OREGON; American literature
- GUERRA, JUAN C.; PhD, 1992, UNIVERSITY OF ILLINOIS; Literacy, Ethnography, Composition, Pedagogy and Chicano Literature
- HUDSON, LOIS PHILLIPS; LITD, 1965, NORTH DAKOTA STATE UNIVERSITY; fiction writing
- LONGYEAR, CHRISTOPHER R.; PhD, 1961, UNIVERSITY OF MICHIGAN; linguistics.
- MUSSETTER, SALLY ANN; PhD, 1975, CORNELL UNIVERSITY; medieval language and literature
- PALOMO, DOLORES J.; PhD, 1972, STATE UNIVERSITY OF NEW YORK (BUFFALO); Renaissance literature, women writers
- PATTERSON, MARK R.; PhD, 1981, PRINCETON UNIVERSITY; American literature
- SIMPSON, CAROLINE CHUNG; PhD, 1994, UNIVERSITY OF TEXAS (AUSTIN); Asian American studies and postwar American culture
- SMITH, EUGENE H.; PhD, 1963, UNIVERSITY OF WASHINGTON; rhetoric and theory of composition
- STANTON, ROBERT B.; PhD, 1953, INDIANA UNIVERSITY; American literature
- STYGALL, GAIL; PhD, 1989, INDIANA UNIVERSITY; discourse analysis, rhetoric and composition, English language linguistics, forensic linguistics
- WEBSTER, JOHN M.; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); Renaissance literature

Assistant Professor

- CHAUDHARY, ZAHID R.; PhD, 2004, CORNELL UNIVERSITY; postcolonial theory & lit, critical theory
- FEETHAM, ELIZABETH L.; PhD, 1977, UNIVERSITY OF WASHINGTON; Graduate education in the United States
- GRIFFITH, MALCOLM A.; PhD, 1966, OHIO STATE UNIVERSITY; twentieth-century literature, modern criticism, American literature
- HARKINS, GILLIAN H.; PhD, 2002, UNIVERSITY OF CALIFORNIA

- (BERKELEY); gender and sexuality, twentieth century U.S. fiction
- KANNO, YASUKO; PhD, 1996, UNIVERSITY OF TORONTO (CANADA); language and identity; bilingual education; language minority education; qualitative research

Lecturer

- GEORGE, E. LAURIE; PhD, 1984, UNIVERSITY OF OREGON; computer-integrated pedagogy (writing and literature) feminist pedagogies, rhetoric
- LUSKEY, MATTHEW C.; PhD, 2003, UNIVERSITY OF OREGON; Composition and Rhetoric, Interdisciplinary Writing, Modernism, Film Studies
- POPOV, NIKOLAI B.; PhD, 1994, UNIVERSITY OF WASHINGTON; modern irish, slavic, and german writers, literary theory and criticism; translation
- SIMMONS-ONEILL, ELIZABETH; PhD, 1988, UNIVERSITY OF WASHINGTON; expository and interdisciplinary writing, service learning
- WACKER, NORMAN J.; PhD, 1986, UNIVERSITY OF WASHINGTON; expository and interdisciplinary writing

Geography

Professor

- FLEMING, DOUGLAS K.; PhD, 1965, UNIVERSITY OF WASHINGTON; transportation geography (especially ocean and air), regional organization of western Europe
- HART, LAWRENCE G.; PhD, 1985, UNIVERSITY OF WASHINGTON; rural health policy, medical geography
- JACKSON, W A DOUGLAS; PhD, 1953, UNIVERSITY OF MARYLAND; Canada
- KRUMME, GUNTER; PhD, 1966, UNIVERSITY OF WASHINGTON; economic geography, regional economics, location theory, organization and decision theory
- MAYER, JONATHAN D.; PhD, 1977, UNIVERSITY OF MICHIGAN; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases
- MORRILL, RICHARD L.; PhD, 1959, UNIVERSITY OF WASHINGTON; social and economic geography, theory and quantitative methods, spatial organization, migration
- NYERGES, TIMOTHY L.; PhD, 1980, OHIO STATE UNIVERSITY; GIS, spatial decision support, urban, transportation, environment, groupware
- VELIKONJA, JOSEPH; PhD, 1948, STATE UNIVERSITY (ITALY); social and political geography, international migration, immigrants in America, eastern Europe
- ZUMBRUNNEN, CRAIG; PhD, 1973, UNIVERSITY OF CALIFORNIA

- (BERKELEY); resource analysis, Russia and NIS, environment, mathematical programming, urban ecology

Associate Professor

- CHANG, KUEI-SHENG; PhD, 1955, UNIVERSITY OF MICHIGAN; economic geography of China, historical geography of exploration, Third World development.
- JAROSZ, LUCY A.; PhD, 1990, UNIVERSITY OF CALIFORNIA (BERKELEY); critical development studies, food and agriculture, rural poverty and inequality, political ecology
- KAKIUCHI, GEORGE H.; PhD, 1957, UNIVERSITY OF MICHIGAN; Japan, agriculture, internal migration, regional geography
- SPARKE, MATTHEW; PhD, 1996, UNIVERSITY OF BRITISH COLUMBIA (CANADA); political-geography, social theory, cultural studies, globalization

Germanics

Professor

- HRUBY, ANTONIN F.; PhD, 1946, CHARLES UNIVERSITY (CZECHOSLOVAKIA); medieval literature
- REY, WILLIAM H.; PhD, 1937, UNIVERSITY OF FRANKFURT (GERMANY); nineteenth and twentieth century German literature

Associate Professor

- MC LEAN, SAMMY K.; PhD, 1963, UNIVERSITY OF MICHIGAN; Western drama, 20th-c poetry, psychoanalysis and literature, literary translation

Lecturer

- BRANDL, KLAUS K.; PhD, 1991, UNIVERSITY OF TEXAS (AUSTIN); foreign language pedagogy, applied linguistics, foreign language teacher training

History

Professor

- ALDEN, DAURIL; PhD, 1959, UNIVERSITY OF CALIFORNIA (BERKELEY); Latin American history, comparative colonial history
- BACHARACH, JERE L.; PhD, 1967, UNIVERSITY OF MICHIGAN; history of the Near East
- BERGQUIST, CHARLES W.; PhD, 1973, STANFORD UNIVERSITY; modern Latin American history, comparative labor history, Third World development

BRIDGMAN, JON M; PhD, 1960, STANFORD UNIVERSITY; modern European history (especially military)

BUTOW, ROBERT J C; PhD, 1953, STANFORD UNIVERSITY; East Asian diplomatic history

CONLON, FRANK F; PhD, 1969, UNIVERSITY OF MINNESOTA; history of India

EBREY, PATRICIA B.; PhD, 1975, COLUMBIA UNIVERSITY; The social and cultural history of China, especially the Song Dynasty (960-1279).

FERRILL, ARTHUR L; PhD, 1964, UNIVERSITY OF ILLINOIS; ancient history

FOWLER, WILTON B; PhD, 1966, YALE UNIVERSITY; American history (especially diplomatic)

GIL, CARLOS; PhD, 1975, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Latin America and history of the Chicano people

GREGORY, JAMES N; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); U.S. social and political history since 1865, labor, the West

HANKINS, THOMAS L; PhD, 1964, CORNELL UNIVERSITY; history of science

JONAS, RAYMOND A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); modern France

KIRKENDALL, RICHARD S; PhD, 1958, UNIVERSITY OF WISCONSIN; recent United States history

LEBSOCK, SUZANNE D.; PhD, 1977, UNIVERSITY OF VIRGINIA; history of women, American social history, history of the South

LEVY, FRED J; PhD, 1960, HARVARD UNIVERSITY; history of England in the sixteenth- and seventeenth- centuries, English historiography

PALAIS, JAMES B; PhD, 1968, HARVARD UNIVERSITY; modern Korean history

PEASE, OTIS A; PhD, 1954, YALE UNIVERSITY; United States in the twentieth century.

PRESSLY, THOMAS J; PhD, 1949, HARVARD UNIVERSITY; history

RAFAEL, VICENTE L.; PhD, 1984, CORNELL UNIVERSITY; colonialism and nationalism, technology and translation, Filipino studies, S.E.Asia, Asian American

SAUM, LEWIS O; PhD, 1962, UNIVERSITY OF MISSOURI; American intellectual history

SEARS, LAURIE J; PhD, 1986, UNIVERSITY OF WISCONSIN; Southeast Asian social and cultural history

STACEY, ROBIN C; PhD, 1986, YALE UNIVERSITY; early and high medieval history, tribal law, Celtic/Anglo-Saxon literature, heresy

ULLMAN, JOAN CONNELLY; PhD, 1963, BRYN MAWR COLLEGE; modern Spain

Associate Professor

DONG, YUE; PhD, 1996, UNIVERSITY OF CALIFORNIA (SAN DIEGO); modern

Chinese history, urban history, gender studies

FELAK, JAMES R; PhD, 1989, INDIANA UNIVERSITY; modern East European history

MCKENZIE, ROBERT T; PhD, 1988, VANDERBILT UNIVERSITY; nineteenth-century U.S., U.S. economic

International Studies

Professor

BACHMAN, DAVID M; PhD, 1984, STANFORD UNIVERSITY; Chinese politics and foreign policy and China's political economy (1949-present); US-China relations

BRASS, PAUL R; PhD, 1964, UNIVERSITY OF CHICAGO; comparative government, international relations

BUTOW, ROBERT J C; PhD, 1953, STANFORD UNIVERSITY; East Asian diplomatic history

ELLISON, HERBERT J; PhD, 1955, UNIVERSITY OF LONDON (UK); modern Russian history

HANLEY, SUSAN B; PhD, 1971, YALE UNIVERSITY; premodern Japan

HELLMANN, DONALD C; PhD, 1964, UNIVERSITY OF CALIFORNIA (BERKELEY); Japanese politics and international relations

KAPETANIC, DAVOR; PhD, 1972, UNIVERSITY OF ZAGREB (YUGOSLAVIA); Yugoslav literature, Slavic literary theory

LEGTTERS, LYMAN H; PhD, 1958, FREIE UNIVERSITÄT BERLIN (GERMANY); Russian and East European Studies.

MAH, FENG-HWA; PhD, 1959, UNIVERSITY OF MICHIGAN; Chinese economy and foreign trade.

MICKLESEN, LEW R; PhD, 1951, HARVARD UNIVERSITY; Slavic linguistics

MIGDAL, JOEL S; PhD, 1972, HARVARD UNIVERSITY; state and society in the Third World; Middle East politics

PALAIS, JAMES B; PhD, 1968, HARVARD UNIVERSITY; modern Korean history

POZNANSKI, KAZIMIERZ; PhD, 1974, UNIVERSITY OF WARSAW (POLAND); international trade; economics of technology; comparative economic systems

WEBB, EUGENE; PhD, 1965, COLUMBIA UNIVERSITY; modern English, French, and German literature, comparative religion

YAMAMURA, KOZO; PhD, 1964, NORTH-WESTERN UNIVERSITY; economic development and economic history of Japan, comparative economic history

YANG, ANAND A; PhD, 1976, UNIVERSITY OF VIRGINIA; History of labor migration and crime and punishment in colonial South and Southeast Asia

Associate Professor

ANCHORDOGUY, MARIE C; PhD, 1986, UNIVERSITY OF CALIFORNIA (BERKELEY); Japan's political economy; East Asian economic development

DONG, YUE; PhD, 1996, UNIVERSITY OF CALIFORNIA (SAN DIEGO); modern Chinese history, urban history, gender studies

GIEBEL, CHRISTOPH; PhD, 1996, CORNELL UNIVERSITY; Viet Nam; 20th century history, communism, labor, post-independence historiography

LAVELY, WILLIAM R.; PhD, 1982, UNIVERSITY OF MICHIGAN; social demography of China

SPARKE, MATTHEW; PhD, 1996, UNIVERSITY OF BRITISH COLUMBIA (CANADA); political-geography, social theory, cultural studies, globalization

WARREN, JONATHAN W.; PhD, 1997, UNIVERSITY OF CALIFORNIA (BERKELEY); race and ethnicity, Latin American studies, cultural studies, Native American studies

YOUNG, GLENNYS J.; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); late Imperial and early Soviet Russia

Assistant Professor

TOKUNO, KYOKO; PhD, 1994, UNIVERSITY OF CALIFORNIA (BERKELEY); Chinese and Japanese Buddhism of medieval period. Buddhist polemical literature in China

WELLMAN, JAMES K.; PhD, 1995, UNIVERSITY OF CHICAGO; Western religions, contemporary American religion, liberal Protestantism, US & global evangelicalism

Linguistics

Professor

AUGEROT, JAMES E.; PhD, 1968, UNIVERSITY OF WASHINGTON; Slavic linguistics, Romanian, Bulgarian

BARRACK, CHARLES M; PhD, 1969, UNIVERSITY OF WASHINGTON; Germanic linguistics

BROME, MICHAEL; PhD, 1970, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; syntax, phonology, structure of Arabic and English, cross-linguistic comparisons, poetics

CONTRERAS, HELES; PhD, 1961, INDIANA UNIVERSITY; Spanish linguistics, syntax and English semantics

HUNN, EUGENE S; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); cognitive anthropology, ethnobiology, cultural ecology and evolution, North American Indians

KUHL, PATRICIA K; PhD, 1973, UNIVERSITY OF MINNESOTA; speech perception.

MICKLESEN, LEW R.; PhD, 1951, HARVARD UNIVERSITY; Slavic linguistics
 NEUMEYER, FREDERICK; PhD, 1969, UNIVERSITY OF ILLINOIS; theoretical and English syntax, history of linguistics
 OSTENDORF, MARI; PhD, 1985, STANFORD UNIVERSITY; Speech synthesis and understanding; spoken document retrieval; statistical pattern recognition.
 STOEL-GAMMON, CAROL; PhD, 1974, STANFORD UNIVERSITY; developmental phonology and phonetics
 TOLLEFSON, JAMES W.; PhD, 1978, STANFORD UNIVERSITY; English as a second language, language planning
 VOYLES, JOSEPH B.; PhD, 1965, INDIANA UNIVERSITY; Germanics and linguistics
 YUE-HASHIMOTO, ANNE O.; PhD, 1966, OHIO STATE UNIVERSITY; Chinese linguistics, grammar (historical and modern), dialectology, historical reconstruction

Associate Professor

DZIWIREK, KATARZYNA A.; PhD, 1991, UNIVERSITY OF CALIFORNIA (SAN DIEGO); linguistics, syntax and typology
 ETZIONI, OREN; PhD, 1990, CARNEGIE MELLON UNIVERSITY; artificial intelligence and information retrieval, natural language interfaces, software agents
 KAUTZ, HENRY; PhD, 1988, UNIVERSITY OF ROCHESTER; artificial intelligence, knowledge representation, decision-theoretic control of reasoning
 OHTA, AMY; PhD, 1993, UNIVERSITY OF CALIFORNIA (LOS ANGELES); applied linguistics, especially second language acquisition, discourse analysis, and Japanese
 OSTERHOUT, LEE E.; PhD, 1990, TUFTS UNIVERSITY; psycholinguistics, cognitive psychophysiology
 STROZER, JUDITH R.; PhD, 1976, UNIVERSITY OF CALIFORNIA (LOS ANGELES); comparative Romance syntax, second language acquisition, foreign language teaching
 WRIGHT, RICHARD A.; PhD, 1996, UNIVERSITY OF CALIFORNIA (LOS ANGELES); phonetics, production/perception, automatic speech recognition, phonology, African languages

Assistant Professor

BILANIUK, LAADA M.; PhD, 1998, UNIVERSITY OF MICHIGAN; Language politics, language ideology, ethnicity, nationalism, gender, Ukraine, former USSR.
 BILMES, JEFFREY A.; PhD, 1999, UNIVERSITY OF CALIFORNIA (BERKELEY); Speech & pattern recognition, learning, audio processing, high-performance computing, human-computer

HANDEL, ZEV; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Chinese historical phonology; Sino-Tibetan linguistics.

Mathematics

Professor

ARSOVE, MAYNARD G.; PhD, 1950, BROWN UNIVERSITY; potential theory, complex function theory, theory of bases
 BLUMENTHAL, ROBERT M.; PhD, 1956, CORNELL UNIVERSITY; probability
 BROWNELL, FRANCIS H.; PhD, 1949, YALE UNIVERSITY; differential equations, applied mathematics
 BUBE, KENNETH P.; PhD, 1978, STANFORD UNIVERSITY; numerical analysis, partial differential equations
 BURDZY, KRZYSZTOF; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); probability theory
 BURKE, JAMES V.; PhD, 1983, UNIVERSITY OF ILLINOIS; optimization, nonsmooth analysis
 CHAYES, JENNIFER T.; PhD, 1983, PRINCETON UNIVERSITY; theoretical condensed-matter physics
 CHEN, ZHEN-QING; PhD, 1992, WASHINGTON UNIVERSITY; probability theory and stochastic analysis
 COLLINGWOOD, DAVID; PhD, 1983, UNIVERSITY OF UTAH; computational biology, Lie theory
 CURJEL, CASPAR R.; DSc, 1960, EIDGENOSSE TECHNISCHE HOCHSCHULE (SWITZ); algebraic topology, algebra
 DUBISCH, ROY; PhD, 1943, UNIVERSITY OF CHICAGO; teacher training, elementary and secondary curriculum
 DUCHAMP, THOMAS E.; PhD, 1976, UNIVERSITY OF ILLINOIS; differential geometry
 FREEDMAN, MICHAEL H.; PhD, 1973, PRINCETON UNIVERSITY; topology
 GANGOLLI, RAMESH A.; PhD, 1961, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; probability theory, harmonic analysis on Lie groups
 GOLDSTEIN, ALLEN A.; PhD, 1954, GEORGETOWN UNIVERSITY; approximation theory, nonlinear programming, control theory, calculus of variations
 GOODEARL, KENNETH R.; PhD, 1971, UNIVERSITY OF WASHINGTON; noncommutative algebra (noetherian rings, quantum groups, regular rings, C^* -algebras)
 GRAHAM, C. ROBIN; PhD, 1981, PRINCETON UNIVERSITY; partial differential equations, differential geometry, invariant theory
 GREENBAUM, ANNE; PhD, 1981, UNIVERSITY OF CALIFORNIA (BERKELEY); applied analysis and computational mathematics

GREENBERG, RALPH; PhD, 1971, PRINCETON UNIVERSITY; number theory
 GRUNBAUM, BRANKO; PhD, 1957, HEBREW UNIVERSITY (ISRAEL); geometry
 KAS, ARNOLD; PhD, 1966, STANFORD UNIVERSITY; Bioinformatics, Genetics and Genome Annotation.
 KIM, JEONG HAN; PhD, 1993, RUTGERS UNIVERSITY; mathematical physics (statistical mechanics), combinatorics
 KLEE, VICTOR; PhD, 1949, UNIVERSITY OF VIRGINIA; convex sets, functional analysis, analysis of algorithms, optimization, combinatorics
 KOBLITZ, NEAL I.; PhD, 1974, PRINCETON UNIVERSITY; number theory and cryptography
 LEE, JOHN M.; PhD, 1982, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; differential geometry and partial differential equations
 LOVASZ, LASZLO; PhD, 1977, HUNGARIAN ACADEMY OF SCIENCES; discrete mathematics
 MARSHALL, DONALD E.; PhD, 1976, UNIVERSITY OF CALIFORNIA (LOS ANGELES); complex analysis
 MCGOVERN, WILLIAM M.; PhD, 1987, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; representation theory
 MICHAEL, ERNEST A.; PhD, 1951, UNIVERSITY OF CHICAGO; topology
 MITCHELL, STEPHEN A.; PhD, 1981, UNIVERSITY OF WASHINGTON; algebraic topology
 MORROW, JAMES ALLEN; PhD, 1967, STANFORD UNIVERSITY; complex singularities, inverse problems
 NAMIOKA, ISAAC; PhD, 1956, UNIVERSITY OF CALIFORNIA (BERKELEY); functional analysis
 NIJENHUIS, ALBERT; PhD, 1952, UNIVERSITY OF AMSTERDAM (NETHERLANDS); geometry, combinatorics, computational complexity
 NUNKE, RONALD; PhD, 1955, UNIVERSITY OF CHICAGO; category theory, Abelian groups
 PHELPS, ROBERT R.; PhD, 1958, UNIVERSITY OF WASHINGTON; convexity, functional analysis, geometry of Banach spaces, optimization
 RAGOZIN, DAVID; PhD, 1967, HARVARD UNIVERSITY; approximation theory
 ROCKAFELLAR, R T.; PhD, 1963, HARVARD UNIVERSITY; variational analysis and optimization
 ROHDE, STEFFEN; PhD, 1989, UNIVERSITY OF BERLIN (GERMANY); complex analysis
 SCHRAMM, ODED; PhD, 1990, PRINCETON UNIVERSITY; complex analysis
 SEGAL, JACK; PhD, 1960, UNIVERSITY OF GEORGIA; topology, shape theory
 SMITH, HART F.; PhD, 1989, PRINCETON UNIVERSITY; partial differential equations, Fourier analysis

SMITH, SHOLTO PAUL; PhD, 1981, UNIVERSITY OF LEEDS (UK); algebra

SOLOMYAK, BORIS; PhD, 1986, LENINGRAD UNIVERSITY (RUSSIA); ergodic theory, symbolic dynamics, spectral theory

SULLIVAN, JOHN B; PhD, 1971, CORNELL UNIVERSITY; representations of classic groups

SYLVESTER, JOHN; PhD, 1980, NEW YORK UNIVERSITY; partial differential equations

TORO, TATIANA; PhD, 1992, STANFORD UNIVERSITY; analysis and geometric measure theory

TSENG, PAUL YUN; PhD, 1986, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; optimization

TUNCCEL, SELIM; PhD, 1982, UNIVERSITY OF WARWICK (UK); ergodic theory, symbolic dynamics

UHLMANN, GUNTHER A.; PhD, 1976, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; partial differential equations

WARNER, GARTH; PhD, 1966, UNIVERSITY OF MICHIGAN; algebraic topology

WESTWATER, MICHAEL; PhD, 1967, CAMBRIDGE UNIVERSITY (UK); mathematical physics

ZHANG, JIAN JAMES; PhD, 1991, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; algebra, ring theory

Associate Professor

ARMS, JUDITH M; PhD, 1977, UNIVERSITY OF CALIFORNIA (BERKELEY); geometric analysis of Hamiltonian systems with symmetry

BILLEY, SARA; PhD, 1994, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Algebraic combinatorics

BUNGART, LUTZ; PhD, 1962, PRINCETON UNIVERSITY; several complex variables

DEVINATZ, ETHAN S; PhD, 1985, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; algebraic topology

HOFFMAN, CHRISTOPHER; PhD, 1996, STANFORD UNIVERSITY; ergodic theory of p-adic endomorphisms, percolation theory

KING, JAMES RICHARD; PhD, 1969, UNIVERSITY OF CALIFORNIA (BERKELEY); complex manifolds, instructional computing in geometry

KOVACS, SANDOR J; PhD, 1995, UNIVERSITY OF UTAH; algebraic geometry, complex geometry, commutative algebra

PALMIERI, JOHN; PhD, 1991, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; algebraic topology, representation theory

POLLACK, DANIEL; PhD, 1991, STANFORD UNIVERSITY; differential geometry and nonlinear partial differential equations

THOMAS, REKHA R.; PhD, 1994, CORNELL UNIVERSITY; computational

algebra, combinatorics, discrete optimization

Assistant Professor

DORAN, CHARLES F.; PhD, 1999, HARVARD UNIVERSITY; Geometry, string theory, number theory

OZOLS, VILNIS; PhD, 1967, UNIVERSITY OF CALIFORNIA (BERKELEY); Lie groups, Riemannian geometry

Lecturer

WARFIELD, VIRGINIA; PhD, 1971, BROWN UNIVERSITY; probability and the teaching of mathematics

Music

Professor

BEALE, JAMES M; MMus, 1947, YALE UNIVERSITY; theory/composition

CARLSEN, JAMES C; PhD, 1962, NORTHWESTERN UNIVERSITY; systematic musicology, psychomusicology, research methodology, theories of music instruction

CURTIS-VERNA, MARY; BA, 1943, HOLLINS COLLEGE (VIRGINIA); voice

DEMPSTER, STUART R; MA, 1967, SAN FRANCISCO STATE; trombone, contemporary music

ELLINGSON, TERRY J; PhD, 1979, UNIVERSITY OF WISCONSIN; ethnomusicology, anthropology, religion, Tibet, Nepal, Buddhism;

GROSSMAN, ARTHUR; Diploma, 1955, CURTIS INSTITUTE OF MUSIC; bassoon

HOKANSON, RANDOLPH H; , 0, ; studied with Dame Myra Hess, Howard Ferguson (London); piano

KAPLAN, ABRAHAM; Diploma, 1957, JUILLIARD SCHOOL; choral conducting, composition

KAPPY, DAVID L; MM, 1971, UNIVERSITY OF WISCONSIN; French horn performance, chamber music, and theory

KECHLEY, GERALD; MA, 1950, UNIVERSITY OF WASHINGTON; theory/composition

LUNDQUIST, BARBARA R; DMA, 1973, UNIVERSITY OF WASHINGTON; music education, sociomusicology, ethnomusicology in schools

LUNDQUIST, BARBARA R; MS, 1959, MONTANA STATE UNIVERSITY; music education, sociomusicology, ethnomusicology in schools

MC CABE, ROBIN L; DMA, 1976, JUILLIARD SCHOOL; MMus, 1973, JUILLIARD SCHOOL; piano performance, communication skills, and pedagogy

MC COLL, WILLIAM; Diploma, 1955, STATE ACADEMY OF MUSIC (AUSTRIA); clarinet

SALZMAN, TIMOTHY O; MM, 1979, NORTHERN ILLINOIS UNIVERSITY; wind ensemble conducting, pedagogy and repertoire

SIKI, BELA; Diploma, 1948, CONSERVATOIRE DE MUSIQUE (SWITZERLAND); piano literature with special interest in interpretation and performance

SMITH, WILLIAM O; MA, 1952, UNIVERSITY OF CALIFORNIA (BERKELEY); theory/composition

SOKOL, VILEM; BMus, 1938, OBERLIN COLLEGE; MMus, 1946, OBERLIN COLLEGE; violin, viola, conducting

STORCH, LAILA; BA, 1964, WILKES COLLEGE; oboe

THOME, DIANE; PhD, 1973, PRINCETON UNIVERSITY; theory/composition

ZSIGMONDY-LIEDMANN, DENES; BA, 1940, GYMNASIUM, BUDAPEST (HUNGARY); violin

Associate Professor

BENSHOOF, KENNETH; MA, 1963, SAN FRANCISCO STATE; theory/composition.

HARPER, THOMAS; MM, 1976, UNIVERSITY OF ARKANSAS; classical singing, vocal pedagogy, opera, baroque music

IMMEL, DON T.; MM, 1996, RICE UNIVERSITY; artistic advancement of trombone performance, teaching and literature

JUSSILA, CLYDE F; MS, 1951, KANSAS STATE UNIVERSITY; music education

ROSINBUM, RALPH; MA, 1948, UNIVERSITY OF WASHINGTON; opera production

TARICANI, JO ANN; PhD, 1986, UNIVERSITY OF PENNSYLVANIA; music history and literature

Assistant Professor

COLLIER, THOMAS W; BA, 1971, UNIVERSITY OF WASHINGTON; BMus, 1971, UNIVERSITY OF WASHINGTON; percussion performance and mallet jazz improvisational techniques

Near Eastern Languages and Literature

Professor

HEER, NICHOLAS L.; PhD, 1955, PRINCETON UNIVERSITY; Arabic language and literature, Islamic theology and philosophy

MACKAY, PIERRE A; PhD, 1964, UNIVERSITY OF CALIFORNIA (BERKELEY); Greek literature, post classical and Byzantine Greek literature, numismatics

ZIADEH, FARHAT J; LLB, 1940, UNIVERSITY OF LONDON (UK); Arabic language and literature, Islamic law, Islamic institutions

Associate Professor

NOEGEL, SCOTT B.; PhD, 1994, CORNELL UNIVERSITY; ancient Near Eastern languages, literatures, cultures, and history

Assistant Professor

ELKHAFIFI, HUSSEIN M.; PhD, 1985, UNIVERSITY OF UTAH; Arabic language, second language acquisition, pedagogy, language policy & planning, standardization

Philosophy

Professor

BOLER, JOHN F.; PhD, 1960, HARVARD UNIVERSITY; medieval philosophy
DIETRICHSON, PAUL; PhD, 1955, YALE UNIVERSITY; philosophy of religion, ethics, metaphysics
JECKER, NANCY A.S.; PhD, 1986, UNIVERSITY OF WASHINGTON; philosophical and ethical aspects of health care delivery and policy
MARKS, CHARLES; PhD, 1972, CORNELL UNIVERSITY; philosophy of mind, modern philosophy
POTTER, KARL H.; PhD, 1955, HARVARD UNIVERSITY; South Asia, Indian philosophy, epistemology
RICHMAN, ROBERT J.; PhD, 1953, HARVARD UNIVERSITY; ethics, epistemology.
TALBOTT, WILLIAM J.; PhD, 1976, HARVARD UNIVERSITY; epistemology, ethics, social and political philosophy, rational choice theory

Associate Professor

MISHALANI, JAMES K.; PhD, 1961, BROWN UNIVERSITY; ethics, philosophical anthropology, contemporary continental philosophy
MOORE, RONALD M.; PhD, 1971, COLUMBIA UNIVERSITY; philosophy of law, aesthetics
ROBERTS, JEAN VALERIE; PhD, 1982, UNIVERSITY OF PITTSBURGH; ancient Greek philosophy, ethics, philosophy of feminism
ROSENTHAL, MICHAEL; PhD, 1996, UNIVERSITY OF CHICAGO; History of Early Modern philosophy, moral and political philosophy, and Jewish thought

Assistant Professor

GOERING, SARA L.; PhD, 1998, UNIVERSITY OF COLORADO (DENVER); bioethics, moral philosophy
MOORE, ADAM DANIEL; PhD, 1997, OHIO STATE UNIVERSITY; Philosophy of Law, Intellectual Property, Political Philosophy, Applied Ethics, Privacy Rights

SMITH, ANGELA; PhD, 1999, HARVARD UNIVERSITY; moral and political philosophy

Physics

Professor

ADELBERGER, ERIC G.; PhD, 1967, CALIFORNIA INSTITUTE OF TECHNOLOGY; experimental gravitational physics; experimental nuclear physics
ALBERG, MARY ANN; PhD, 1974, UNIVERSITY OF WASHINGTON; theoretical nuclear physics
BAKER, DAVID; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); protein folding, genomics
BAKER, MARSHALL; PhD, 1958, HARVARD UNIVERSITY; field theory, theoretical elementary-particle physics
BERTSCH, GEORGE F.; PhD, 1965, PRINCETON UNIVERSITY; theoretical physics, nuclear and atomic cluster physics
BICHSEL, HANS; PhD, 1951, UNIVERSITY OF BASEL (SWITZERLAND); experimental nuclear physics
BODANSKY, DAVID.; PhD, 1950, HARVARD UNIVERSITY; experimental nuclear physics.
BOULWARE, DAVID G.; PhD, 1962, HARVARD UNIVERSITY; field theory, theoretical elementary-particle physics, general relativity.
BOWLES, THOMAS J.; PhD, 1978, PRINCETON UNIVERSITY; experimental nuclear physics
BROWN, FREDERICK C.; PhD, 1950, HARVARD UNIVERSITY; use of synchrotron radiation in experimental solid state physics
BROWN, LOWELL S.; PhD, 1961, HARVARD UNIVERSITY; field theory, theoretical elementary-particle physics
BUCK, WARREN W.; PhD, 1976, COLLEGE OF WILLIAM AND MARY; physics and nuclear energy
BULGAC, AUREL; PhD, 1977, LENINGRAD NUCLEAR PHYSICS INST (RUSSIA); many body theory, molecular dynamics, classical and quantum chaos
BURNETT, THOMPSON H.; PhD, 1968, UNIVERSITY OF CALIFORNIA (SAN DIEGO); experimental elementary-particle physics
CAHN, JOHN WERNER; PhD, 1953, UNIVERSITY OF CALIFORNIA (BERKELEY); theoretical condensed-matter physics
CAMPBELL, CHARLES T.; PhD, 1979, UNIVERSITY OF TEXAS (AUSTIN); physical chemistry of solid surfaces, chemisorption, catalysis, and surface analysis
CHALLOUPKA, VLADIMIR; PhD, 1975, UNIVERSITY OF GENEVA (SWITZERLAND); experimental elementary-particle physics

CHAYES, JENNIFER T.; PhD, 1983, PRINCETON UNIVERSITY; theoretical condensed-matter physics
CLARK, KENNETH C.; PhD, 1947, HARVARD UNIVERSITY; optical spectroscopy, upper atmosphere
COOK, VICTOR; PhD, 1962, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental high-energy physics.
CRAMER, JOHN G.; PhD, 1961, RICE UNIVERSITY; experimental nuclear physics
DASH, J GREGORY; PhD, 1951, COLUMBIA UNIVERSITY; cryogenics, surface physics, thermal physics, ice physics
DEHMELT, HANS G.; PhD, 1950, UNIVERSITY OF GOTTINGEN (GERMANY); single particle radio-frequency and laser spectroscopy of trapped electrons, positrons and ions
DROBNY, GARY P.; PhD, 1981, UNIVERSITY OF CALIFORNIA (BERKELEY); two-dimensional and multiple quantum studies in nuclear magnetic resonance
DUNHAM, SCOTT T.; PhD, 1985, STANFORD UNIVERSITY; Modeling and simulation of microfabrication processes and device behavior.
ELLIS, STEPHEN D.; PhD, 1971, CALIFORNIA INSTITUTE OF TECHNOLOGY; theoretical elementary-particle physics
GERHART, JAMES B.; PhD, 1954, PRINCETON UNIVERSITY; experimental nuclear physics, physics education
GUNDLACH, JENS; PhD, 1990, UNIVERSITY OF WASHINGTON; experimental nuclear physics
HALPERN, ISAAC; PhD, 1948, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; experimental nuclear physics
HAXTON, WICK C.; PhD, 1976, STANFORD UNIVERSITY; theoretical physics, nuclear physics
HECKEL, BLAYNE; PhD, 1981, HARVARD UNIVERSITY; experimental neutron and atomic physics
HENLEY, ERNEST M.; PhD, 1952, UNIVERSITY OF CALIFORNIA (BERKELEY); theoretical nuclear physics, theoretical elementary-particle physics
HOLZWORTH, ROBERT; PhD, 1977, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental space plasma physics, atmospheric/magnetospheric electric fields, thunderstorms
INGALLS, ROBERT L.; PhD, 1962, CARNEGIE MELLON UNIVERSITY; experimental condensed-matter physics
JARBOE, THOMAS R.; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); plasma physics and controlled fusion, magnetic reconnection and relaxation
KAPLAN, DAVID B.; PhD, 1985, HARVARD UNIVERSITY; theoretical nuclear and elementary-particle physics
LORD, JERE J.; PhD, 1950, UNIVERSITY OF CHICAGO; cosmic rays, experimental elementary-particle physics

LUBATTI, HENRY J.; PhD, 1966, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental elementary-particle physics
 MC DERMOTT, LILLIAN C.; PhD, 1959, COLUMBIA UNIVERSITY; physics education.
 MC DERMOTT, MARK N.; PhD, 1959, COLUMBIA UNIVERSITY; radio-frequency spectroscopy.
 MILLER, GERALD; PhD, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; theoretical nuclear physics
 OHUCHI, FUMIO; PhD, 1981, UNIVERSITY OF FLORIDA; nucleation and growth of thin film materials, surface science, glass, device applications
 OLMSTEAD, MARJORIE A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental condensed-matter physics, surface and interface physics
 PUFF, ROBERT D.; PhD, 1960, HARVARD UNIVERSITY; many-body theory, statistical physics.
 REHR, JOHN J.; PhD, 1972, CORNELL UNIVERSITY; theoretical condensed-matter physics
 REINHARDT, WILLIAM P.; PhD, 1968, HARVARD UNIVERSITY; theoretical and computational chemistry with applications in thermodynamics and atomic physics
 RIEDEL, EBERHARD K.; PhD, 1966, TECHNICAL UNIVERSITY OF MUNICH (GERMANY); theoretical condensed-matter physics
 ROTHBERG, JOSEPH E.; PhD, 1963, COLUMBIA UNIVERSITY; experimental high-energy physics
 SAVAGE, MARTIN J.; PhD, 1990, CALIFORNIA INSTITUTE OF TECHNOLOGY; nuclear and particle physics
 SCHICK, MICHAEL; PhD, 1967, STANFORD UNIVERSITY; theoretical condensed-matter physics
 SHARPE, STEPHEN R.; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); theoretical particle physics: lattice gauge theory and strong interaction phenomenology
 SORENSEN, LARRY B.; PhD, 1980, UNIVERSITY OF ILLINOIS; experimental condensed-matter physics
 SPIVAK, BORIS; PhD, 1970, LENINGRAD POLYTECHNIC INSTITUTE (RUSSIA); theoretical condensed-matter physics
 STUBBS, CHRISTOPHER; PhD, 1988, UNIVERSITY OF WASHINGTON; observational cosmology and gravitation
 THOULESS, DAVID; PhD, 1958, CORNELL UNIVERSITY; theoretical condensed-matter physics
 VAN DYCK, ROBERT S.; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental atomic physics
 WETTLAUFER, JOHN S.; PhD, 1991, UNIVERSITY OF WASHINGTON; fundamental and applied physics of ice and crystal growth
 WILETS, LAWRENCE; PhD, 1952,

PRINCETON UNIVERSITY; theoretical nuclear and atomic physics
 WILKERSON, JOHN F.; PhD, 1982, UNIVERSITY OF NORTH CAROLINA; experimental nuclear and particle physics and astrophysics
 WILLIAMS, ROBERT W.; PhD, 1948, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; experimental high-energy physics, cosmic rays
 WINGLEE, ROBERT M.; PhD, 1984, UNIVERSITY OF SYDNEY (AUSTRALIA); space plasma physics, numerical simulation of space plasmas
 YAFFE, LAURENCE G.; PhD, 1980, PRINCETON UNIVERSITY; quantum field theory, elementary particle theory

Research Professor

DOE, PETER J.; PhD, 1977, UNIVERSITY OF DURHAM (UK); Electro-weak interactions and solar neutrino physics
 NAGOURNEY, WARREN; PhD, 1972, COLUMBIA UNIVERSITY; experimental atomic physics, high resolution laser spectroscopy of atoms
 SNOVER, KURT ALBERT; PhD, 1969, STANFORD UNIVERSITY; experimental nuclear physics.
 STORM, DEREK; PhD, 1970, UNIVERSITY OF WASHINGTON; nuclear physics, especially medium energy, accelerator physics.
 TRAINOR, THOMAS A.; PhD, 1973, UNIVERSITY OF NORTH CAROLINA; experimental nuclear physics.

Associate Professor

ELLIOTT, STEVEN R.; PhD, 1987, UNIVERSITY OF CALIFORNIA (IRVINE); particle and nuclear physics
 KELLER, SARAH L.; PhD, 1995, PRINCETON UNIVERSITY; biophysics; physical chemistry; soft condensed matter; surfactants; lipids; self-assembly
 QUINN, THOMAS R.; PhD, 1986, PRINCETON UNIVERSITY; Solar System dynamics and galaxy formation
 RIEKE, FREDERICK MARTIN; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); sensory signal processing and computation
 SEIDLER, GERALD T.; PhD, 1993, UNIVERSITY OF CHICAGO; condensed matter experiment: microstructural kinetics and nonequilibrium statistical mechanics
 SHAFFER, PETER S.; PhD, 1993, UNIVERSITY OF WASHINGTON; research on the learning and teaching of physics
 WATTS, GORDON T.; PhD, 1995, UNIVERSITY OF ROCHESTER; accelerator-based elementary particle physics

Research Associate Professor

ZHAO, TIANCHI; PhD, 1987, COLUMBIA UNIVERSITY; experimental high energy physics instrumentation and detectors

Assistant Professor

AGOL, ERIC; PhD, 1997, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); Black holes, accretion disks, quasars, gravitational lensing, planetary transits, dark matter.

Lecturer

ROBERTSON, CHARLES E.; MS, 1981, UNIVERSITY OF WASHINGTON; physics education

Political Science

Professor

BRASS, PAUL R.; PhD, 1964, UNIVERSITY OF CHICAGO; comparative government, international relations
 CASSINELLI, CHARLES W.; PhD, 1953, HARVARD UNIVERSITY; comparative government (Latin America)
 GERBERDING, WILLIAM P.; PhD, 1959, UNIVERSITY OF CHICAGO; American government and politics, public policy
 GOLDBERG, ELLIS; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); political economy of the Middle East, comparative politics
 GORE, WILLIAM J.; PhD, 1952, UNIVERSITY OF SOUTHERN CALIFORNIA; public policy, public administration
 HANSON, STEPHEN E.; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); Soviet, post-Soviet and comparative politics
 KEELER, JOHN T.; PhD, 1978, HARVARD UNIVERSITY; comparative politics (Western Europe), international relations
 LANG, GLADYS ENGEL; PhD, 1954, UNIVERSITY OF CHICAGO; political effects of mass media, sociology of art, political movements and crowd behavior.
 LEV, DANIEL S.; PhD, 1964, CORNELL UNIVERSITY; comparative politics (Southeast Asia)
 LEVI, MARGARET; PhD, 1974, HARVARD UNIVERSITY; comparative politics, political economy, labor politics
 MAJESKI, STEPHEN J.; PhD, 1981, INDIANA UNIVERSITY; international relations, foreign policy, peace and conflict resolution
 MATTHEWS, DONALD ROWE; PhD, 1953, PRINCETON UNIVERSITY; American government and politics, comparative politics (Norway, U.K.)
 MAY, PETER J.; PhD, 1979, UNIVERSITY OF CALIFORNIA (BERKELEY); policy processes; policy design and implementation; environmental regulation
 MC CANN, MICHAEL W.; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); American government and politics, public law, political theory
 MC CRONE, DONALD J.; PhD, 1966, UNIVERSITY OF NORTH CAROLINA;

American politics, political economy, methodology
 MODELSKI, GEORGE; PhD, 1954, UNIVERSITY OF LONDON (UK); international relations, international political enemy
 OLSON, DAVID J; PhD, 1971, UNIVERSITY OF WISCONSIN; American government and politics (urban, state, and labor relations)
 RESHETAR, JOHN S; PhD, 1950, HARVARD UNIVERSITY; comparative government (Soviet Union), international relations.
 SCHEINGOLD, STUART A; PhD, 1963, UNIVERSITY OF CALIFORNIA (BERKELEY); American politics (public law)
 WARD, MICHAEL D.; PhD, 1977, NORTHWESTERN UNIVERSITY; international relations, political economy, political geography, statistical models

Associate Professor

ROHN, PETER H; PhD, 1958, UNIVERSITY OF WASHINGTON; international relations, international law
 WHITING, SUSAN H.; PhD, 1995, UNIVERSITY OF MICHIGAN; political economy of development in post-1949 China
 WILKERSON, JOHN D; PhD, 1991, UNIVERSITY OF ROCHESTER; American government and politics, quantitative methodology

Assistant Professor

ADOLPH, CHRISTOPHER A; PhD, 2004, HARVARD UNIVERSITY; comparative political economy, political methodology
 OSANLOO, ARZOO; PhD, 2002, STANFORD UNIVERSITY; everyday discourses and perceptions of rights in Iran's Islamic Republic

Psychology

Professor

BARASH, DAVID P; PhD, 1970, UNIVERSITY OF WISCONSIN; sociobiology, psychological aspects of the arms race and nuclear war, peace studies, animal behavior
 BECKER, JOSEPH; PhD, 1958, DUKE UNIVERSITY; psychosocial aspects of depression
 BERNSTEIN, ILENE L; PhD, 1972, UNIVERSITY OF CALIFORNIA (LOS ANGELES); neurobiology of taste aversion learning; developmental and genetic contributions to taste preference
 BOOTH-LAFORCE, CATHRYN L; PhD, 1974, OHIO STATE UNIVERSITY; mother-infant interaction, observational methodology, child birth experiences and attachment

BOWEN, DEBORAH J; PhD, 1986, UNIFORMED SERVICE U OF THE HEALTH SC.; health psychology
 BRENOWITZ, ELIOT A.; PhD, 1982, CORNELL UNIVERSITY; animal behavior, neuroethology, neuroendocrinology, animal communication
 BUCK, STEVEN L.; PhD, 1976, UNIVERSITY OF CALIFORNIA (SAN DIEGO); human visual psychophysics, color vision, animal learning.
 CARR, JOHN E; PhD, 1963, SYRACUSE UNIVERSITY; phobic disorders, patient therapist matching & therapy outcome, cross-cultural psychopathology
 CAUCE, ANA MARI; PhD, 1984, YALE UNIVERSITY; at-risk children, adolescents, and families; normative development in ethnic minority youth
 COVEY, ELLEN; PhD, 1980, DUKE UNIVERSITY; Structure and function of the central auditory system.
 CRAFT, SUZANNE; PhD, 1985, UNIVERSITY OF TEXAS (AUSTIN); neuropsychology of attention and memory in development and aging
 DAWSON, GERALDINE; PhD, 1979, UNIVERSITY OF WASHINGTON; developmental disabilities, autism, and neuropsychology
 DIAZ, JAIME; PhD, 1975, UNIVERSITY OF CALIFORNIA (LOS ANGELES); psychological brain development, neurophysiology, developmental psychopharmacology, effects of drugs
 DOERR, HANS O; PhD, 1965, FLORIDA STATE UNIVERSITY; psychophysiology of central and autonomic nervous systems, neuropsychology
 DONOVAN, DENNIS; PhD, 1980, UNIVERSITY OF WASHINGTON; cognitive-behavioral factors in substance abuse and addictive behaviors
 FIEDLER, FRED E; PhD, 1949, UNIVERSITY OF CHICAGO; leadership and group effectiveness, social and organizational psychology
 GEORGE, WILLIAM H; PhD, 1982, UNIVERSITY OF WASHINGTON; alcohol use and sexual behavior, addiction issues, sexual assault issues, racism issues
 GOTTMAN, JOHN M; PhD, 1971, UNIVERSITY OF WISCONSIN; children's emotional and social development, meta-emotion in families, marriages..
 GURALNICK, MICHAEL J; PhD, 1967, LEHIGH UNIVERSITY; developmental disabilities, peer relations, social and language development, evaluation systems
 HUNT, EARL B; PhD, 1960, YALE UNIVERSITY; individual differences in cognition, cognition in education and the work place
 KIYAK, H ASUMAN; PhD, 1977, WAYNE STATE UNIVERSITY; geriatric dentistry, behavioral aspects of health care
 KOHLENBERG, ROBERT J.; PhD, 1968, UNIVERSITY OF CALIFORNIA (LOS

ANGELES); clinical behavior modification, learning, biofeedback, psychotherapy
 LINEHAN, MARSHA M; PhD, 1971, LOYOLA UNIVERSITY (CHICAGO); behavioral assessment and therapy, suicide and parasuicide, borderline personality disorders
 LOCKARD, JOAN S.; PhD, 1963, UNIVERSITY OF WISCONSIN; primate social behavior, animal behavior, sociobiology, human ethology, neurobehavior
 LOFTUS, GEOFFREY R; PhD, 1971, STANFORD UNIVERSITY; perception, memory, cognitive processes and information processing
 MARLATT, G ALAN; PhD, 1968, INDIANA UNIVERSITY; cognitive-behavior therapy and assessment, addictive behaviors, relapse prevention, harm reduction
 MC CAULEY, ELIZABETH; PhD, 1973, STATE UNIVERSITY OF NEW YORK (BUFFALO); developmental psychopathology focused on affective disorders, behavioral genetics
 MCMAHON, ROBERT J.; PhD, 1979, UNIVERSITY OF GEORGIA; assessment, prevention, treatment of children with conduct disorders; developmental psychopathology
 MELTZOFF, ANDREW N; PhD, 1976, OXFORD UNIVERSITY (UK); perceptual, cognitive and social development in infants
 MIZUMORI, SHERI J; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); plasticity of neural and behavioral function during learning and memory
 MORRISON, DIANE M; PhD, 1982, UNIVERSITY OF WASHINGTON; sexual decision-making, attitudes and behavior, teen pregnancy
 PATTERSON, DAVID R.; PhD, 1982, FLORIDA STATE UNIVERSITY; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma
 RAMSAY, DOUGLAS S; PhD, 1988, UNIVERSITY OF WASHINGTON; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry
 RUBEL, EDWIN W.; PhD, 1969, MICHIGAN STATE UNIVERSITY; developmental neurobiology, with special emphasis on vertebrate auditory system development
 SACKETT, GENE P; PhD, 1963, CLAREMONT GRADUATE SCHOOL; experimental psychology, primate behavior, early experience and development
 SARASON, IRWIN G; PhD, 1955, INDIANA UNIVERSITY; personality, social support, stress and anxiety
 SAX, GILBERT; PhD, 1958, UNIVERSITY OF SOUTHERN CALIFORNIA; measurement, statistics and research design.

SMITH, RONALD E.; PhD, 1968, SOUTHERN ILLINOIS UNIVERSITY; clinical, personality, sport psychology
 SMOLL, FRANK L.; PhD, 1970, UNIVERSITY OF WISCONSIN; developmental kinesiology, children's sports, sport psychology, behavioral assessment of coaches.
 SPELTZ, MATTHEW L.; PhD, 1980, UNIVERSITY OF MISSOURI; developmental psychotherapy, family therapy, pediatric behavioral medicine
 SPIEKER, SUSAN J.; PhD, 1982, CORNELL UNIVERSITY; developmental psychology, infant security, mother-infant interaction
 TELLER, DAVIDA Y.; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); vision, psychophysics, development of vision
 VITALIANO, PETER P.; PhD, 1975, SYRACUSE UNIVERSITY; psychiatric methodology (epidemiology, design, psychometrics), behavioral medicine
 WEBSTER-STRATTON, CAROLYN; PhD, 1980, UNIVERSITY OF WASHINGTON; parent intervention programs for behaviorally disturbed children
 WEINSTEIN, PHILIP; PhD, 1971, UNIVERSITY OF KENTUCKY; dental behavioral science, treatment and prevention of fear and pain, clinical assessment.

Research Professor

BAER, JOHN S.; PhD, 1986, UNIVERSITY OF OREGON; clinical psychology, addictive behaviors, early intervention
 LATTEMANN, DIANNE; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); Effect of Regulatory Peptides on Feeding and Behavior and Metabolism

Associate Professor

BASSOK, MIRIAM; PhD, 1984, HEBREW UNIVERSITY (ISRAEL); learning, problem solving, analogical reasoning
 BEAUCHAINE, THEODORE P.; PhD, 2000, STATE UNIV OF NEW YORK (STONY BROOK); autonomic nervous system functioning and psychopathology, child development, statistics
 BROWN, JONATHAN D.; PhD, 1986, UNIVERSITY OF CALIFORNIA (LOS ANGELES); self-concept and social behavior; coping with failure and disappointment
 CARLSON, STEPHANIE M.; PhD, 1997, UNIVERSITY OF OREGON; cognitive and social development in preschool children
 COLDWELL, SUSAN E.; PhD, 1994, UNIVERSITY OF PENNSYLVANIA; pain, anxiety, and taste preference
 COMTOIS, KATHERINE ANN; PhD, 1992, UNIVERSITY OF MARYLAND; services research, borderline personality disorder, women, dual diagnosis
 CORINA, DAVID P.; PhD, 1991, UNIVER-

SITY OF CALIFORNIA (SAN DIEGO); cognitive neuropsychology, psycholinguistics, computational modeling
 KAHN, PETER H.; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); Social and Moral Development. Information, Technology, and Nature
 KIM, JEANSOK J.; PhD, 1991, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Neural circuits and mechanisms of learning & memory; Effects of stress on brain and behavior
 KIVLAHAN, DANIEL R.; PhD, 1983, UNIVERSITY OF MISSOURI; evaluating assessment, prevention, and treatment approaches for addictive behaviors
 LARIMER, MARY E.; PhD, 1992, UNIVERSITY OF WASHINGTON; prevention of alcohol problems among college students
 LENGUA, LILIANA J.; PhD, 1994, ARIZONA STATE UNIVERSITY; stress, temperament, coping, ecological models of the development of psychological symptomatology
 MIYAMOTO, JOHN M.; PhD, 1985, UNIVERSITY OF MICHIGAN; mathematical psychology, preference and utility theory, cognitive theories
 O'DONNELL, SEAN; PhD, 1993, UNIVERSITY OF WISCONSIN; genotypic and endocrine effects on social organization and division of labor in insects
 OLAVARRIA, JAIME F.; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); neurophysiological and neuroanatomical basis of vision
 OSTERHOUT, LEE E.; PhD, 1990, TUFTS UNIVERSITY; psycholinguistics, cognitive psychophysiology
 ROSE, RICHARD M.; PhD, 1964, UNIVERSITY OF PENNSYLVANIA; stochastic models, psychophysics, sleep
 SIMONI, JANE M.; PhD, 1990, UNIVERSITY OF CALIFORNIA (LOS ANGELES); HIV/AIDS; influence of culture and social support on psychological well-being

Research Associate Professor

FITTS, DOUGLAS A.; PhD, 1978, WASHINGTON STATE UNIVERSITY; neurobiology, salt/water regulation, thirst
 HA, JAMES; PhD, 1989, COLORADO STATE UNIVERSITY; animal behavior, especially ethology, evolution, infant primate development, and statistics
 KATZ, LYNN FAINSLBER; PhD, 1990, UNIVERSITY OF ILLINOIS; antisocial children, social psychophysiology, family interaction, parent-child interaction
 KYES, RANDALL C.; PhD, 1989, UNIVERSITY OF GEORGIA; primate behavior and ecology, neural mechanisms of behavior

Assistant Professor

SAWCHUK, CRAIG NEIL; PhD, 1999, UNIVERSITY OF ARKANSAS; Adult

anxiety disorders, medical fears, & health care service utilization in underserved populations

Research Assistant Professor

CARRERE, SYBIL; PhD, 1990, UNIVERSITY OF CALIFORNIA (IRVINE); interface between family relationships, stress, and health

Lecturer

BARRETT, KIMBERLY; EdD, 1989, UNIVERSITY OF SAN FRANCISCO; substance abuse and the family and the impact of racism on children
 FAGAN, COREY N.; PhD, 1988, UNIVERSITY OF MASSACHUSETTS; clinical psychology, program evaluation research, individual and family therapy
 JOSLYN, SUSAN L.; PhD, 1995, UNIVERSITY OF WASHINGTON; cognition, autobiographical memory, multitasking, applied issues
 LITTLE, LAURA M.; PhD, 1998, UNIVERSITY OF NEW MEXICO; quantitative methodology
 MC DERMOTT, LOIS J.; PhD, 1979, UNIVERSITY OF CHICAGO; human sexuality and reproductive physiology

Romance Languages and Literatures

Professor

ANDERSON, FARRIS FURMAN; PhD, 1968, UNIVERSITY OF WISCONSIN; nineteenth- and twentieth-century Spanish literature; Spanish grammar
 CHRISTOFIDES, C G; PhD, 1956, UNIVERSITY OF MICHIGAN; medieval, seventeenth century, Romanesque
 LEINER, JACQUELINE; Docteur es Lettres, 1969, UNIVERSITY OF STRASBOURG (FRANCE); modern French literature.
 O'HARA, EDGAR; PhD, 1989, UNIVERSITY OF TEXAS (AUSTIN); Latin American poetry and essay, composition and creative writing
 VANCE, EUGENE; PhD, 1964, CORNELL UNIVERSITY; medieval literature, the history of criticism, and discourse analysis

Associate Professor

COLLINS, DOUGLAS P.; PhD, 1978, UNIVERSITY OF MISSOURI; twentieth-century French literature
 DALE, ROBERT C.; PhD, 1963, UNIVERSITY OF WISCONSIN; nineteenth-century French literature, cinema
 ELLRICH, ROBERT J.; PhD, 1960, HARVARD UNIVERSITY; eighteenth-century French literature

FRIEDRICH, PIA; PhD, 1946, UNIVERSITY OF TURIN (ITALY); pedagogy and twentieth-century Italian literature
SBRAGIA, ALBERT J.; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); modern and contemporary Italian literature and cinema
SHIPLEY, GEORGE A.; PhD, 1968, HARVARD UNIVERSITY; Spanish golden age literature
WORTLEY, W VICTOR; PhD, 1964, UNIVERSITY OF OREGON; seventeenth-century French theatre and prose (nonfiction).

Lecturer

BASDEO, GANESH D.; MA, 1976, UNIVERSITY OF WASHINGTON; second-year Spanish, Spanish linguistics
BENSADON, LEON M.; MA, 1991, UNIVERSITY OF WASHINGTON; Spanish language and reading for graduate students
BODDEN, RODNEY V.; PhD, 1969, UNIVERSITY OF WISCONSIN; second- and third-year Spanish programs.
BRANDL, KLAUS K.; PhD, 1991, UNIVERSITY OF TEXAS (AUSTIN); foreign language pedagogy, applied linguistics, foreign language teacher training
FOX, JOAN H.; MA, 1973, UNIVERSITY OF BRITISH COLUMBIA (CANADA); Spanish language, translation, business Spanish
GONZALEZ, JORGE; MM, 1986, UNIVERSITY OF WISCONSIN; Spanish language
KENNEDY, DONALLY S.; MA, 1988, UNIVERSITY OF WASHINGTON; Spanish language
LEPORACE, GIUSEPPE; MA, 1989, UNIVERSITY OF WASHINGTON; Italian pedagogy and translation
MEYER, HEDWIGE M.; MA, 1992, UNIVERSITY OF WASHINGTON; French pedagogy
RANEDA-CUARTERO, I.; MA, 1994, UNIVERSITY OF WISCONSIN; second- and third-year Spanish language, Spanish culture

Scandinavian Languages and Literature

Professor

STEENE, BIRGITTA; PhD, 1960, UNIVERSITY OF WASHINGTON; Scandinavian drama and film, children's literature, comparative literature

Associate Professor

CONROY, PATRICIA L.; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); Scandinavian philology, Icelandic language and literature, Danish, Faroese

INGEBRITSEN, CHRISTINE; PhD, 1993, CORNELL UNIVERSITY; Scandinavian domestic and foreign policies, European community integration and Scandinavia
SEHMSDORF, HENNING K.; PhD, 1968, UNIVERSITY OF CHICAGO; folklore and mythology, Norwegian language and literature, comparative literature.
WARME, LARS G.; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); Swedish language and literature, Scandinavian novel, comparative literature.

Lecturer

BRANDL, KLAUS K.; PhD, 1991, UNIVERSITY OF TEXAS (AUSTIN); foreign language pedagogy, applied linguistics, foreign language teacher training

Slavic Languages and Literature

Professor

KAPETANIC, DAVOR; PhD, 1972, UNIVERSITY OF ZAGREB (YUGOSLAVIA); Yugoslav literature, Slavic literary theory
KRAMER, KARL D.; PhD, 1964, UNIVERSITY OF WASHINGTON; Russian literature
MICKLESEN, LEW R.; PhD, 1951, HARVARD UNIVERSITY; Slavic linguistics

Associate Professor

COATS, HERBERT S.; PhD, 1970, UNIVERSITY OF ILLINOIS; Slavic linguistics, Russian phonology, Russian syntax, Slavic accentuation
CRNKOVIC, GORDANA; PhD, 1993, STANFORD UNIVERSITY; East European literature, film and cultural studies, former Yugoslavia, theory, American literature

Assistant Professor

ALANIZ, JOSE; PhD, 2003, UNIVERSITY OF CALIFORNIA (BERKELEY); Russian lit., death & dying

Lecturer

HOLDSWORTH, NORA; BA, 1965, UNIVERSITY OF WASHINGTON; Russian language
POLACK, ZOYA M.; MA, 1975, UNIVERSITY OF WASHINGTON; Russian and Ukrainian languages.

Sociology

Professor

BORGATTA, EDGAR F.; PhD, 1952, NEW YORK UNIVERSITY; methodology, social psychology, demography-ecology, aging
BURSTEIN, PAUL; PhD, 1974, HARVARD UNIVERSITY; political sociology, social movements, social stratification, public policy, law
CAMPBELL, FREDERICK L.; PhD, 1967, UNIVERSITY OF MICHIGAN; population and ecology, social organization
COSTNER, HERBERT L.; PhD, 1960, INDIANA UNIVERSITY; methodology, social change
GREMBOWSKI, DAVID; PhD, 1982, UNIVERSITY OF WASHINGTON; health services research, survey research, program evaluation, performance of health care systems
HAMILTON, GARY G.; PhD, 1975, UNIVERSITY OF WASHINGTON; economic sociology, historical comparative, organizational studies, East Asia
HECHTER, MICHAEL N.; PhD, 1972, COLUMBIA UNIVERSITY; rational choice theory, nationalism, intergroup relations, norms and values
HIRSCHMAN, CHARLES; PhD, 1972, UNIVERSITY OF WISCONSIN; demography, race and ethnic relations, social stratification, Southeast Asia
KISER, EDGAR VANCE; PhD, 1987, UNIVERSITY OF ARIZONA; political sociology, theory, historical sociology
LANG, GLADYS ENGEL; PhD, 1954, UNIVERSITY OF CHICAGO; political effects of mass media, sociology of art, political movements and crowd behavior.
LANG, KURT; PhD, 1953, UNIVERSITY OF CHICAGO; political and social effects of the media on mass communication; arts and society; public opinion
LARSEN, OTTO; PhD, 1955, UNIVERSITY OF WASHINGTON; mass communications, public opinion, collective behavior
MIYAMOTO, S FRANK; PhD, 1950, UNIVERSITY OF CHICAGO; social psychology, collective behavior.
MORRIS, WANDA MARTINA; PhD, 1989, UNIVERSITY OF CHICAGO; network models, population dynamics, economic inequality, AIDS
PATRICK, DONALD L.; PhD, 1972, COLUMBIA UNIVERSITY; health status and quality of life, end of life, adolescents
SCHMITT, DAVID R.; PhD, 1963, WASHINGTON UNIVERSITY; experimental social psychology, exchange relations
TOLNAY, STEWART E.; PhD, 1981, UNIVERSITY OF WASHINGTON; social demography, race and ethnicity, marriage and family
VAN DEN BERGHE, PIERRE; PhD, 1960, HARVARD UNIVERSITY; comparative sociology, stratification, race and ethnic relations, kinship, sociobiology

WAGER, L WESLEY; PhD, 1959, UNIVERSITY OF CHICAGO; organizations/occupations, theory, macrosociology
WEIS, JOSEPH G; DCrim, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); crime, delinquency, social control, deviance.

Associate Professor

STOVEL, KATHERINE W.; PhD, 1999, UNIVERSITY OF NORTH CAROLINA; organizational change and career outcomes; social networks; networks and disease transmission

Research Associate Professor

HERTING, JERALD R.; PhD, 1987, UNIVERSITY OF WASHINGTON; research methodology and at-risk youth

Assistant Professor

KITTS, JAMES A.; PhD, 2001, CORNELL UNIVERSITY; organizational dynamics, social networks, social exchange, collective action
LEPORE, PAUL C.; PhD, 1997, UNIVERSITY OF WISCONSIN; social psychology, social structure and personality, sociology of education, adolescence
PETTIT, ELIZABETH M.; PhD, 1999, PRINCETON UNIVERSITY; sociology of the family, social demography, inequality

Speech and Hearing Science

Professor

FOLSOM, RICHARD C; PhD, 1979, UNIVERSITY OF WASHINGTON; pediatric audiology
KUHL, PATRICIA K; PhD, 1973, UNIVERSITY OF MINNESOTA; speech perception.
MINIFIE, FRED D; PhD, 1963, UNIVERSITY OF IOWA; speech science
MOORE, CHRISTOPHER A.; PhD, 1985, PURDUE UNIVERSITY; speech production, speech development, speech physiology, acoustics, motor control, coordination
NORTON, SUSAN J.; PhD, 1982, UNIVERSITY OF WASHINGTON; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals
OLSWANG, LESLEY B.; PhD, 1978, UNIVERSITY OF WASHINGTON; language development and disorders/clinical processes
PRINS, DAVID; PhD, 1961, UNIVERSITY OF MICHIGAN; stuttering
STOEL-GAMMON, CAROL; PhD, 1974, STANFORD UNIVERSITY; developmental phonology and phonetics

THOMPSON, GARY; PhD, 1967, UNIVERSITY OF MINNESOTA; pediatric audiology, clinical evaluation
WERNER, LYNNE A.; PhD, 1980, LOYOLA UNIVERSITY (CHICAGO); auditory development, infant psychoacoustics
WILSON, WESLEY; PhD, 1969, UNIVERSITY OF WASHINGTON; audiology, infant assessment and aural rehabilitation.
YORKSTON, KATHRYN; PhD, 1975, UNIVERSITY OF OREGON; neurogenic communication disorders in adults

Associate Professor

BURNS, EDWARD M.; PhD, 1977, UNIVERSITY OF MINNESOTA; psychoacoustics
CARPENTER, ROBERT L; PhD, 1969, NORTHWESTERN UNIVERSITY; language and language disorders.
COGGINS, TRUMAN E; PhD, 1976, UNIVERSITY OF WISCONSIN; language disorders in children.
COOKER, HARRY S; PhD, 1963, UNIVERSITY OF IOWA; speech physiology
FEENEY, M. PATRICK; PhD, 1993, UNIVERSITY OF WASHINGTON; The aging auditory system and wideband assessment of middle-ear function
MILLER, ROBERT M; PhD, 1976, UNIVERSITY OF WASHINGTON; speech, language pathology, adults, swallowing
REES, THOMAS; PhD, 1972, UNIVERSITY OF WASHINGTON; audiology.
ROGERS, MARGARET A.; PhD, 1992, UNIVERSITY OF IOWA; spoken language production, aphasia and apraxia of speech
SOUZA, PAMELA E; PhD, 1996, SYRACUSE UNIVERSITY; hearing aids, effects of sensorineural hearing loss on speech perception, aging
TREMBLAY, KELLY L; PhD, 1998, NORTHWESTERN UNIVERSITY; central auditory physiology and aging

Assistant Professor

DOWDEN, PATRICIA A; PhD, 1993, UNIVERSITY OF WASHINGTON; augmentative communication, cleft palate
EADIE, TANYA L; PhD, 2003, UNIVERSITY OF WESTERN ONTARIO (CANADA); Voice disorders, postlaryngectomy speech and voice, models of health and disability
SPENCER, KRISTIE A.; PhD, 2003, UNIVERSITY OF WASHINGTON; stages of speech production occurring before motor execution, neurologic communication disorders

Lecturer

ALARCON, NANCY B.; MS, 1981, UNIVERSITY OF WISCONSIN; speech-language disorders/adult.

MILLER, ROBERT M; PhD, 1976, UNIVERSITY OF WASHINGTON; speech, language pathology, adults, swallowing
STONE-GOLDMAN, JUDITH R; PhD, 1986, UNIVERSITY OF WASHINGTON; language development and disorders, counseling

Instructor

BRANSON, CYNTHIA J; MA, 1970, NORTHWESTERN UNIVERSITY; speech-language disorders/child

Statistics

Professor

BURDZY, KRZYSZTOF; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); probability theory
BURKE, JAMES V.; PhD, 1983, UNIVERSITY OF ILLINOIS; optimization, nonsmooth analysis
FELSENSTEIN, JOSEPH; PhD, 1968, UNIVERSITY OF CHICAGO; estimation of evolutionary trees, models of long-term evolutionary processes
FLEMING, THOMAS RICHARD; PhD, 1976, UNIVERSITY OF MARYLAND; survival analysis, cancer clinical trials, AIDS research, sequential analysis
FORD, E DAVID; PhD, 1968, UNIVERSITY COLLEGE, LONDON (UK); quantitative science, ecosystem analysis, forest productivity
GROENEBOOM, PETRUS; PhD, 1979, UNIVERSITY OF AMSTERDAM (NETHERLANDS); statistical inverse problems
GUTTORP, PETER; PhD, 1980, UNIVERSITY OF CALIFORNIA (BERKELEY); point processes, stochastic models, applications to hydrology, environmental and atmospheric science
HANDCOCK, MARK S.; PhD, 1989, UNIVERSITY OF CHICAGO; methodology for the social sciences; spatial, environmental modeling; distributional comparison
HAYNOR, DAVID R; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); medical image processing and segmentation; image deformation; functional MRI; expression arrays
KRONMAL, RICHARD A; PhD, 1964, UNIVERSITY OF CALIFORNIA (LOS ANGELES); nonparametric density estimation, computer algorithms, cardiovascular data analysis
MASON, DAVID M; PhD, 1977, UNIVERSITY OF WASHINGTON; nonparametric, order statistics; extreme value theory, limit theorems; empirical, quantile processes
NELSON, CHARLES R; PhD, 1969, UNIVERSITY OF WISCONSIN; time series analysis, economic statistical

analysis, advanced macroeconomic theory

- PERLMAN, MICHAEL D; PhD, 1967, STANFORD UNIVERSITY; multivariate analysis, graphical Markov models, decision theory, probability inequalities, convexity
- RAFFERTY, ADRIAN ELMES; Doctorat d'Etat, 1980, UNIVERSITE DE PARIS VI (FRANCE); time series, spatial, Bayesian statistics, population estimation, model selection, sociology
- SCHOLZ, FRIEDRICH-WILHELM; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); estimation, large sample theories; nonparametric statistics; risk and tolerance analysis; bootstrap
- SIEGEL, ANDREW F; PhD, 1977, STANFORD UNIVERSITY; statistics, computing, corporate finance, investments, data analysis
- STUETZLE, WERNER; PhD, 1977, SWISS FEDERAL INSTITUTE OF TECHNOLOGY; nonparametric methods in multivariate analysis, statistical applications of computer graphics
- THOMPSON, ELIZABETH A; PhD, 1974, CAMBRIDGE UNIVERSITY (UK); statistical analysis of human genetic data, conservation and computational biology
- WELLNER, JON A; PhD, 1975, UNIVERSITY OF WASHINGTON; large-sample theory, asymptotic efficiency, empirical processes, semiparametric models

Research Professor

- SAMPSON, PAUL D; PhD, 1979, UNIVERSITY OF MICHIGAN; spatial statistics, environmetrics; morphometrics, multivariate analysis; statistical consulting
- ZEH, JUDITH; PhD, 1979, UNIVERSITY OF WASHINGTON; estimation of population size and dynamics; robust

methods, computing in infectious disease research

Associate Professor

- ALTSCHUL, ROBERTO; PhD, 1973, CASE WESTERN RESERVE UNIVERSITY; reliability models, fault trees for phased missions, stochastic models for fault tolerant systems
- GNEITING, TILMANN J.; PhD, 1997, BAYREUTH UNIVERSITY (GERMANY); spatial and environmental statistics, positive definite functions
- PERCIVAL, DONALD B; PhD, 1983, UNIVERSITY OF WASHINGTON; time series and signal analysis, computational environments, statistics of clocks
- RICHARDSON, THOMAS S.; PhD, 1996, CARNEGIE MELLON UNIVERSITY; graphical models; algorithmic model selection; Bayesian inference; causal models; economics problems
- STEPHENS, MATTHEW; PhD, 1997, OXFORD UNIVERSITY (UK); Bayesian inference, classification and clustering, Markov chain Monte Carlo, statistical genetics

Assistant Professor

- EROSHEVA, ELENA A.; PhD, 2002, CARNEGIE MELLON UNIVERSITY; statistical methodology in the social sciences
- HOFF, PETER D; PhD, 2000, UNIVERSITY OF WISCONSIN; constrained estimation, nonparametric Bayesian methods, two-sided matching models, cancer research
- MEILA-PREDOVICIU, MARINA; PhD, 1999, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; graphical probability models, machine learning, algorithms, data mining
- REYNOLDS, JOEL HOWARD; PhD, 1989, UNIVERSITY OF WASHINGTON; model

assessment, statistical consulting, applications to ecology, wildlife studies

Lecturer

- MORITA, JUNE G; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); sample surveys, quality control, survival analysis, statistical data analysis, statistics education

Women Studies

Professor

- JACOBS, SUE-ELLEN; PhD, 1970, UNIVERSITY OF COLORADO (BOULDER); women studies, socio-cultural and applied anthropology, anthropological studies of women
- WOODS, NANCY; PhD, 1978, UNIVERSITY OF NORTH CAROLINA; women's health

Associate Professor

- GINORIO, ANGELA B; PhD, 1979, FORDHAM UNIVERSITY; women and science, violence against women, sexual harassment, racial identity among Latino/as
- RAMAMURTHY, PRITI; PhD, 1995, SYRACUSE UNIVERSITY; political economy of development; third world feminism; agro-food systems; South Asia

Assistant Professor

- BOYER, DEBRA; PhD, 1986, UNIVERSITY OF WASHINGTON; feminist research methodology, policy and evaluation issues, urban applied anthropology
-

Business School

Accounting

Professor

BERG, KENNETH B; PhD, 1952, UNIVERSITY OF ILLINOIS; financial and managerial accounting

BOWEN, ROBERT M; PhD, 1978, STANFORD UNIVERSITY; financial and managerial accounting. Hubert O. Whitten Endowed Professorship in Accounting

BURGSTAHLER, DAVID C; PhD, 1981, UNIVERSITY OF IOWA; financial and managerial accounting, statistical methods

DUKES, ROLAND E; PhD, 1974, STANFORD UNIVERSITY; financial and managerial accounting

HEATH, LOYD C; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); financial accounting

KENNEDY, S. JANE; PhD, 1992, DUKE UNIVERSITY; Professional judgment/ decision making in accounting, auditing, or business contexts.

MUELLER, FRED J; PhD, 1956, OHIO STATE UNIVERSITY; auditing, not-for-profit, tax accounting.

MUELLER, GERHARD G; PhD, 1962, UNIVERSITY OF CALIFORNIA (BERKELEY); financial accounting and reporting, international accounting

NOREEN, ERIC W; PhD, 1976, STANFORD UNIVERSITY; managerial accounting

RAMANATHAN, K V; PhD, 1970, NORTHWESTERN UNIVERSITY; managerial accounting.

SEFCIK, STEPHAN E; PhD, 1983, UNIVERSITY OF ILLINOIS; financial reporting and environmental accounting issues

SUNDEM, GARY L; PhD, 1971, STANFORD UNIVERSITY; managerial accounting

Associate Professor

RAJGOPAL, SHIVARAM; PhD, 1998, UNIVERSITY OF IOWA; Financial accounting and capital markets, executive stock options, earnings management

SHORES, DONNA J; PhD, 1986, STANFORD UNIVERSITY; Financial accounting, corporate reporting, role of accounting choices in equity valuation and contra

Assistant Professor

CHEN, SHUPING; PhD, 2002, UNIVERSITY OF SOUTHERN CALIFORNIA; firms' voluntary disclosure practices & the role of financial intermediaries on disclosure decisions

Lecturer

RESLER, WILLIAM M; JD, 1972, UNIVERSITY OF WASHINGTON; LLM, 1973, NEW YORK UNIVERSITY; tax accounting.

WELLS, WILLIAM L.; MPAcc, 1989, UNIVERSITY OF WASHINGTON; financial reporting, not-for-profit accounting

Finance and Business Economics

Professor

ALBERTS, WILLIAM; PhD, 1961, UNIVERSITY OF CHICAGO; capital investment planning, business strategy, economics of industrial organization

BRADFORD, WILLIAM D; PhD, 1972, OHIO STATE UNIVERSITY; corporate finance and financial institutions

CONRAD, DOUGLAS A; PhD, 1978, UNIVERSITY OF CHICAGO; alternative vertical and horizontal market structures in health care

D AMBROSIO, CHARLES A; PhD, 1962, UNIVERSITY OF ILLINOIS; finance

FROST, PETER A; PhD, 1966, UNIVERSITY OF CALIFORNIA (LOS ANGELES); finance and business economics

HALEY, CHARLES; PhD, 1968, STANFORD UNIVERSITY; financial management and banking

HANSON, KERMIT O; PhD, 1950, IOWA STATE UNIVERSITY; accounting and statistics.

HESS, ALAN C.; PhD, 1969, CARNEGIE MELLON UNIVERSITY; finance and business economics

JOHNSON, DUDLEY; PhD, 1957, NORTHWESTERN UNIVERSITY; business economics

KARPOFF, JONATHAN M; PhD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); corporate finance, law and economics, microeconomics, natural resources

MALATESTA, PAUL H; PhD, 1982, UNIVERSITY OF ROCHESTER; corporate finance, security and capital markets, corporate mergers, and empirical methods in finance

SCHALL, LAWRENCE D; PhD, 1969, UNIVERSITY OF CHICAGO; finance and business economics.

SIEGEL, ANDREW F; PhD, 1977, STANFORD UNIVERSITY; statistics, computing, corporate finance, investments, data analysis

Associate Professor

DEWENTER, KATHRYN L; PhD, 1993, UNIVERSITY OF CHICAGO; empirical

analysis of finance models in an international context

KOSKI, JENNIFER LYNCH; PhD, 1991, STANFORD UNIVERSITY; dividend policy, market microstructure, stock splits, mutual funds

RICE, EDWARD M; PhD, 1978, UNIVERSITY OF CALIFORNIA (LOS ANGELES); corporate finance, microeconomics, industrial organization

Lecturer

GLASSMAN, DEBRA A; PhD, 1980, UNIVERSITY OF WISCONSIN; international finance, international economic policy, macroeconomics

Management and Organization

Professor

BUCK, VERNON E; PhD, 1963, CORNELL UNIVERSITY; organizational behavior and administrative theory

CHEN, XIAO-PING; PhD, 1998, UNIVERSITY OF ILLINOIS; cross-cultural management, organizational behavior

FENN, MARGARET P; DBA, 1963, UNIVERSITY OF WASHINGTON; organizational behavior and administrative theory

FRENCH, WENDELL L; EdD, 1956, HARVARD UNIVERSITY; organizational behavior, human resources management, organization development

HENNING, DALE A; PhD, 1954, UNIVERSITY OF ILLINOIS; administrative theory and organizational behavior

HILL, CHARLES WILLIAM L; PhD, 1983, UNIVERSITY OF MANCHESTER (UK); business policy, corporate strategy, multinational enterprise

HUBER, VANDRA LEE; DBA, 1982, INDIANA UNIVERSITY; human resource decision making, compensation, and performance appraisal

JOHNSON, RICHARD A; DBA, 1958, UNIVERSITY OF WASHINGTON; business policy

JONES, THOMAS M; PhD, 1977, UNIVERSITY OF CALIFORNIA (BERKELEY); corporate governance, shareholder litigation, corporate social responsibility, business and society

KAST, FREMONT E; DBA, 1956, UNIVERSITY OF WASHINGTON; administrative theory and organizational behavior

KOTHA, SURESH; PhD, 1988, RENSSELAER POLYTECHNIC INSTITUTE; competitive strategy, competing on the internet and e-commerce, and international management

LEE, THOMAS W; PhD, 1984, UNIVERSITY OF OREGON; administrative theory and organizational behavior, human resources management
MITCHELL, TERENCE R.; PhD, 1969, UNIVERSITY OF ILLINOIS; leadership, group processes, motivation, turnover
MOXON, RICHARD W; DBA, 1973, HARVARD UNIVERSITY; international business
NEWELL, WILLIAM T; PhD, 1962, UNIVERSITY OF TEXAS (AUSTIN); operations management and business policy
PETERSON, RICHARD B; PhD, 1966, UNIVERSITY OF WISCONSIN; human resources management
SCOTT, WILLIAM GEORGE; DBA, 1957, INDIANA UNIVERSITY; administrative theory and organizational behavior
SUTERMEISTER, ROBERT A; MA, 1942, UNIVERSITY OF WASHINGTON; personnel and organizational behavior
WOODWORTH, ROBERT T.; PhD, 1963, NORTHWESTERN UNIVERSITY; administrative theory and organizational behavior, human resources management

Associate Professor

BIGLEY, GREGORY; PhD, 1995, UNIVERSITY OF CALIFORNIA (IRVINE); organizational behavior
KIENAST, PHILIP K; PhD, 1972, MICHIGAN STATE UNIVERSITY; human resources management
STEENSMA, HARVEY K.; PhD, 1996, INDIANA UNIVERSITY; business policy
STRONG, DENNIS FULTON; PhD, 1959, UNIVERSITY OF WASHINGTON; business history
WICKMAN, JAMES A; DBA, 1961, UNIVERSITY OF WASHINGTON; risk control and insurance

Assistant Professor

PHELPS, COREY C; PhD, 2001, NEW YORK UNIVERSITY; competitive strategy, technological innovation, strategic alliances, social capital & social networks
REYNOLDS, SCOTT J.; PhD, 2002, UNIVERSITY OF MINNESOTA; individual ethical decision-making, stakeholder decision-making, decision-making biases

Lecturer

GEORGE-FALVY, JANE; PhD, 1995, UNIVERSITY OF WASHINGTON; organizational behavior and human resource management

Management Science

Professor

CHIU, JOHN S Y; PhD, 1960, UNIVERSITY OF ILLINOIS; quantitative methods
DEY, DEBABRATA; PhD, 1994, UNIVERSITY OF ROCHESTER; Heterogeneous and distributed systems; database theory, design and performance; knowledge-based syst
FAALAND, BRUCE H; PhD, 1971, STANFORD UNIVERSITY; quantitative methods
KLASTORIN, THEODORE; PhD, 1973, UNIVERSITY OF TEXAS (AUSTIN); operations management, facility location, project management, waiting lines, logistics, inventory
MOINZADEH, KAMRAN; PhD, 1984, STANFORD UNIVERSITY; operations management, production management, inventory, quality and supply chain management
SIEGEL, ANDREW F; PhD, 1977, STANFORD UNIVERSITY; statistics, computing, corporate finance, investments, data analysis

Associate Professor

HILLIER, MARK S.; PhD, 1994, STANFORD UNIVERSITY; Operations Management, Inventory, Commonality, Mathematical Programming Applications.
SCHMITT, THOMAS G; DBA, 1979, INDIANA UNIVERSITY; MBA, 1974, UNIVERSITY OF CINCINNATI; management of service and manufacturing operations

Assistant Professor

FAN, MING; PhD, 1999, UNIVERSITY OF TEXAS (AUSTIN); The economics & use of information technology in financial services firms, telecommunications
GENG, XIANJUN; PhD, 2003, UNIVERSITY OF TEXAS (AUSTIN); Electronic commerce, economics of information systems, data communications and networking
JAIN, APURVA; PhD, 1999, PURDUE UNIVERSITY; supply chains, Web retailing, logistics, inventory
SUSARLA, ANJANA; PhD, 2003, UNIVERSITY OF TEXAS (AUSTIN); IT outsourcing, Empirical analysis of contracts, customer satisfaction in IT service
TRIPATHI, ARVIND K.; PhD, 2002, UNIVERSITY OF CONNECTICUT; applying optimization techniques & economic analysis pertaining to electronic/mobile commerce

Lecturer

BURROWS, WILLIAM E; MA, 1972, UNIVERSITY OF WASHINGTON; systems analysis/design methodologies and data/file structures

PILCHER, MARTHA G; PhD, 1985, GEORGIA INSTITUTE OF TECHNOLOGY; operations research/operations management, health care applications and logistics

Marketing and International Business

Professor

ERICKSON, GARY; PhD, 1978, STANFORD UNIVERSITY; quantitative models of marketing and analysis of competitive strategies
HARDER, VIRGIL E; PhD, 1958, UNIVERSITY OF ILLINOIS; business communications
JACOBSON, ROBERT L; PhD, 1981, UNIVERSITY OF CALIFORNIA (BERKELEY); marketing strategy
MACLACHLAN, DOUGLAS; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); marketing, data analysis, and marketing research
NARVER, JOHN C; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); market strategy, market-driven organization, pricing policies, marketing management
SPRATLEN, THADDEUS H; PhD, 1962, OHIO STATE UNIVERSITY; marketing
SULLIVAN, JEREMIAH J; PhD, 1970, NEW YORK UNIVERSITY; international business, Japanese management, multinational business management
WHEATLEY, JOHN J; PhD, 1959, STATE UNIVERSITY OF NEW YORK (BUFFALO); marketing
YALCH, RICHARD F; PhD, 1974, NORTHWESTERN UNIVERSITY; advertising management and consumer behavior, marketing management, marketing research

Associate Professor

FOREHAND, MARK ROBECK; PhD, 1997, STANFORD UNIVERSITY; consumer decision making and attitude development
GRATHWOHL, HARRISON L; DBA, 1957, INDIANA UNIVERSITY; marketing

Assistant Professor

DACUNHA, MARCUS V. MORETTI; PhD, 2003, UNIVERSITY OF FLORIDA; Consumer information processing, intertemporal choice, bundling, variety seeking, signal detection.
OKADA, ERICA MINA; PhD, 1999, UNIVERSITY OF PENNSYLVANIA; decision theory, entrepreneurial marketing, and marketing strategy
SCHLOSSER, ANN E.; PhD, 1997, UNIVERSITY OF ILLINOIS; internet marketing

Lecturer

GIAMBATTISTA, MICHELE D.; MBA, 1969,
HARVARD UNIVERSITY; marketing,
international business, technology
KALITZKI, JUDITH ANN; PhD, 1979,
UNIVERSITY OF WASHINGTON;
business communications
ODEGAARD, MARY ANN; PhD, 1980,
STANFORD UNIVERSITY; retailing and
retail management
TURNER, DANIEL J.; PhD, 2001,
NORTHWESTERN UNIVERSITY;
quantitative methods, marketing
management, retailing and pricing
WHELAN, JOHN F.; MA, 1977, YALE
UNIVERSITY; business communications

School of Dentistry

Professor

- AMMONS, WILLIAM F; DDS, 1959, UNIVERSITY OF TEXAS (HOUSTON); MSD, 1970, UNIVERSITY OF WASHINGTON; periodontics
- BEIRNE, OWEN ROSS; PhD, 1976, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); basic and clinical biology of bone tissue reconstruction, bone alloplasts, and anesthesia
- BERG, JOEL H.; MS, 1985, UNIVERSITY OF IOWA; DDS, 1983, UNIVERSITY OF IOWA; Technologies in early caries diagnosis & treatment, Risk Assessment, Pediatric restorative materials
- BOLENDER, CHARLES L; DDS, 1956, UNIVERSITY OF IOWA; MS, 1957, UNIVERSITY OF IOWA; removable prosthodontics.
- BOLLEN, ANNE-MARIE; PhD, 1990, UNIVERSITY OF MICHIGAN; bone metabolism, skeletal growth and development
- BRUDVIK, JAMES S; DDS, 1957, UNIVERSITY OF MINNESOTA; removable prosthodontics.
- BYERS, PETER H; MD, 1969, CASE WESTERN RESERVE UNIVERSITY; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics
- CAMERON, CHERYL A; PhD, 1986, UNIVERSITY OF WASHINGTON; dental hygiene, educational policy, academic and health law
- CANFIELD, ROBERT C; DDS, 1951, UNIVERSITY OF WASHINGTON; restorative dentistry.
- CONRAD, DOUGLAS A; PhD, 1978, UNIVERSITY OF CHICAGO; alternative vertical and horizontal market structures in health care
- DALE-CRUNK, BEVERLY A.; PhD, 1968, UNIVERSITY OF MICHIGAN; keratin biochemistry, epithelial differentiation, antimicrobial peptides
- DARVEAU, RICHARD P.; PhD, 1981, WASHINGTON STATE UNIVERSITY; innate host defense interactions between bacteria and their hosts
- DE ROUEN, TIMOTHY; PhD, 1971, VIRGINIA POLYTECHNIC INST & STATE UNIV; applications of biostatistics to clinical epidemiology of oral and infectious diseases
- DOMOTO, PETER K; DDS, 1964, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); MPH, 1975, UNIVERSITY OF WASHINGTON; pediatric dentistry, dental behavioral science.
- DWORKIN, SAMUEL F; PhD, 1969, NEW YORK UNIVERSITY; dentistry and clinical psychology, pain, psychosomatic and illness-related behavior.
- EYRE, DAVID R.; PhD, 1969, UNIVERSITY OF LEEDS (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism
- FALES, MARTHA H; PhD, 1978, UNIVERSITY OF MICHIGAN; dental hygiene
- FRANK, RICHARD P; DDS, 1962, UNIVERSITY OF IOWA; MSD, 1968, UNIVERSITY OF WASHINGTON; removable prosthodontics
- GEHRIG, JOHN D; DDS, 1946, UNIVERSITY OF MINNESOTA; MSD, 1951, UNIVERSITY OF MINNESOTA; oral and maxillofacial surgery, biological structure
- GIACHELLI, CECILIA; PhD, 1987, UNIVERSITY OF WASHINGTON; adhesion molecules and vascular biology processes
- GREMBOWSKI, DAVID; PhD, 1982, UNIVERSITY OF WASHINGTON; health services research, survey research, program evaluation, performance of health care systems
- HALL, STANTON H; PhD, 1974, UNIVERSITY OF WASHINGTON; orthodontics, cranio-facial development, biochemistry of mineralized tissues..
- HAMILTON, A IAN; PhD, 1968, UNIVERSITY OF LONDON (UK); restorative dentistry.
- HARRINGTON, GERALD W; DDS, 1959, ST LOUIS UNIVERSITY; MSD, 1969, UNIVERSITY OF WASHINGTON; endodontics
- HERRING, SUSAN W.; PhD, 1971, UNIVERSITY OF CHICAGO; vertebrate functional morphology, relations between muscular function and skull growth
- HOLLENDER, LARS GOSTA; PhD, 1964, UNIVERSITY OF LUND (SWEDEN); oral radiology
- IZUTSU, KENNETH; PhD, 1970, UNIVERSITY OF WASHINGTON; salivary gland physiology and pathophysiology, Ca²⁺ signaling in cell function and differentiation
- JOHNSON, GLEN H; DDS, 1978, UNIVERSITY OF WASHINGTON; MS, 1983, UNIVERSITY OF MICHIGAN; instruction, clinical trials and laboratory research with dental bio materials
- JOHNSON, ROBERT H; DDS, 1962, MCGILL UNIVERSITY (CANADA); MSD, 1964, INDIANA UNIVERSITY; periodontics
- KELLER, PATRICIA J; PhD, 1953, WASHINGTON UNIVERSITY; protein structure and function
- KING, GREGORY J.; DMD, 1969, TUFTS UNIVERSITY; MDS, 1976, MCGILL UNIVERSITY (CANADA); bone remodeling, bone cells, mineral metabolism, bone paracrine/endocrine mechanisms
- KIYAK, H ASUMAN; PhD, 1977, WAYNE STATE UNIVERSITY; geriatric dentistry, behavioral aspects of health care
- KOKICH, VINCENT G; DDS, 1971, UNIVERSITY OF WASHINGTON; MSD, 1974, UNIVERSITY OF WASHINGTON; orthodontics: craniofacial growth and development, sutural morphogenesis, premature sutural fusion.
- LE RESCHE, LINDA A; DSc, 1977, JOHNS HOPKINS UNIVERSITY; epidemiology of pain, specifically gender and pain; nonverbal behavior (facial expression)
- LEGGOTT, PENELOPE J; MSC, 1980, UNIVERSITY OF ILLINOIS; pediatric dentistry
- LITTLE, ROBERT M; PhD, 1974, UNIVERSITY OF WASHINGTON; orthodontics.
- MILGROM, PETER M; DDS, 1972, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); management of fearful and phobic dental patients, quality of dental care.
- MOFFETT, BENJAMIN C; PhD, 1952, NEW YORK UNIVERSITY; anatomy
- MOORE, ALTON W; DDS, 1941, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); MS, 1948, UNIVERSITY OF ILLINOIS; orthodontics.
- MORRISON, KENNETH N; DDS, 1943, UNIVERSITY OF TORONTO (CANADA); MSD, 1952, UNIVERSITY OF WASHINGTON; restorative dentistry.
- MORTON, THOMAS H; DDS, 1972, CREIGHTON UNIVERSITY; MSD, 1975, UNIVERSITY OF WASHINGTON; oral pathology, oral medicine
- MOURADIAN, WENDY ELYSE; MD, 1977, COLUMBIA UNIVERSITY; Ethics and quality of life in children's oral, craniofacial health.
- MYALL, ROBERT W.; MD, 1975, UNIVERSITY OF BRITISH COLUMBIA (CANADA); oral and maxillofacial surgery and biological structure
- NARAYANAN, A SAMPATH; PhD, 1967, UNIVERSITY OF MADRAS (INDIA); connective tissue, periodontal disease, regulation of fibroblast growth, matrix synthesis
- NATKIN, EUGENE; DDS, 1957, NEW YORK UNIVERSITY; MSD, 1962, UNIVERSITY OF WASHINGTON; endodontics.
- NICHOLLS, JACK I; PhD, 1965, PURDUE UNIVERSITY; dental materials
- ODA, DOLPHINE; MSC, 1981, UNIVERSITY OF MANITOBA (CANADA); chemical and viral carcinogenesis and genetic alteration of oral cancer
- OSWALD, ROBERT J; DDS, 1969, VIRGINIA COMMONWEALTH UNIVERSITY; endodontics
- PAGE, ROY C; PhD, 1967, UNIVERSITY OF WASHINGTON; connective-tissue pathology, chronic inflammation, immunopathology, periodontal disease
- RAMSAY, DOUGLAS S; PhD, 1988, UNIVERSITY OF WASHINGTON; behavioral medicine/dentistry, physiological psychology, orthodontics, pediatric dentistry
- RIVARA, FREDERICK P.; MD, 1974, UNIVERSITY OF PENNSYLVANIA;

- pediatric epidemiology and injury prevention and research
- ROBERTSON, PAUL B.; DDS, 1966, UNIVERSITY OF ALABAMA; MS, 1972, UNIVERSITY OF ALABAMA; host-bacterial interactions in the etiology and pathogenesis of the periodontal diseases
- ROBINOVITCH, MURRAY; PhD, 1967, UNIVERSITY OF WASHINGTON; salivary biochemistry and salivary anti-HIV activity.
- RUBENSTEIN, JEFFREY E.; DMD, 1975, TUFTS UNIVERSITY; MS, 1980, UNIVERSITY OF TEXAS (HOUSTON); maxillofacial and implant prosthodontics
- SCHUBERT, MARK M.; DDS, 1974, UNIVERSITY OF WASHINGTON; MSD, 1981, UNIVERSITY OF WASHINGTON; oral medicine/oral oncology
- SELIPSKY, HERBERT; MSD, 1973, UNIVERSITY OF WASHINGTON; periodontics.
- SHAPIRO, PETER A.; DDS, 1970, HOWARD UNIVERSITY; MSD, 1973, UNIVERSITY OF WASHINGTON; craniofacial biology, longterm evaluation of orthodontic treatment
- SMITH, DALE E.; DDS, 1952, UNIVERSITY OF PITTSBURGH; MSD, 1962, UNIVERSITY OF WASHINGTON; removable prosthodontics
- STAYTON, PATRICK S.; PhD, 1989, UNIVERSITY OF ILLINOIS; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics
- STEINER, JAMES C.; DDS, 1956, CASE WESTERN RESERVE UNIVERSITY; MSD, 1966, UNIVERSITY OF WASHINGTON; normal sensory mechanisms of human dental pulp and pathologic alterations causing pain
- TRUELOVE, EDMOND L.; DDS, 1967, INDIANA UNIVERSITY; MSD, 1971, INDIANA UNIVERSITY; oral medicine, orofacial pain, stomatitis, and salivary gland disorders
- WARNICK, MYRON E.; DDS, 1955, UNIVERSITY OF ALBERTA (CANADA); restorative dentistry
- WATSON, EILEEN L.; PhD, 1970, UNIVERSITY OF UTAH; salivary gland physiology and regulation
- WEINSTEIN, PHILIP; PhD, 1971, UNIVERSITY OF KENTUCKY; dental behavioral science, treatment and prevention of fear and pain, clinical assessment.
- WHITE, THEODORE C.; PhD, 1984, UNIVERSITY OF MICHIGAN; molecular mechanisms of virulence and drug resistance in pathogenic yeasts
- WILLIAMS, BRYAN J.; DDS, 1974, WESTERN ONTARIO UNIVERSITY (CANADA); MSD, 1979, UNIVERSITY OF WASHINGTON; pediatric dentistry, orthodontics
- WORTHINGTON, PHILIP; MD, 1956, UNIVERSITY OF LIVERPOOL (UK); BDS, 1962, UNIVERSITY OF LIVERPOOL (UK); oral and maxillofacial surgery.
- YAGER, PAUL; PhD, 1980, UNIVERSITY OF OREGON; physical chemistry, applications of biomembranes, biosensors, microfluidics, biomedical diagnostic i
- YUODELIS, RALPH A.; DDS, 1955, UNIVERSITY OF ALBERTA (CANADA); MSD, 1964, UNIVERSITY OF WASHINGTON; restorative dentistry, periodontics
- Research Professor**
- BORDIN, SANDRA; PhD, 1966, UNIVERSITY OF FERRARA (ITALY); regulation of connective tissue repair by immune-inflammatory complement components
- BYERS, MARGARET R.; PhD, 1969, HARVARD UNIVERSITY; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions
- CHAPKO, MICHAEL K.; PhD, 1972, CITY UNIVERSITY OF NEW YORK; ambulatory care, long-term care, cost-effectiveness in health care, international health
- PERSSON, GOSTA RUTGER; PhD, 1978, UNIVERSITY OF LUND (SWEDEN); diagnosis of periodontal diseases and the consecutive process of clinical decision making
- Associate Professor**
- AW, TAR C.; DDS, 1990, NORTHWESTERN UNIVERSITY; MS, 1995, UNIVERSITY OF MICHIGAN; restorative dentistry, operative dentistry, dental materials, computers
- BALES, DAVID J.; DDS, 1957, UNIVERSITY OF WASHINGTON; MSD, 1972, INDIANA UNIVERSITY; restorative dentistry.
- BLOOMQUIST, DALE S.; DDS, 1969, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery.
- BUTSON, TIMOTHY J.; DMD, 1982, UNIVERSITY OF PENNSYLVANIA; MSD, 1992, UNIVERSITY OF WASHINGTON; restorative dentistry, fixed prosthodontics
- CHASTEEN, JOSEPH E.; DDS, 1967, UNIVERSITY OF MICHIGAN; MA, 1976, UNIVERSITY OF MICHIGAN; dental informatics and multi-media instructional programs
- COLDWELL, SUSAN E.; PhD, 1994, UNIVERSITY OF PENNSYLVANIA; pain, anxiety, and taste preference
- CUNNINGHAM, MICHAEL L.; PhD, 1996, UNIVERSITY OF WASHINGTON; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects
- DAVIS, JOHN M.; DDS, 1961, UNIVERSITY OF WASHINGTON; MSD, 1967, UNIVERSITY OF WASHINGTON; pediatric dentistry
- EGBERT, MARK A.; DDS, 1981, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery.
- EVANS, JOHN R.; DDS, 1975, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery.
- FAINE, MARY P.; MS, 1975, UNIVERSITY OF WASHINGTON; nutrition.
- FISSET, LOUIS O.; DDS, 1970, UNIVERSITY OF WASHINGTON; research and management of dental phobia.
- GRAHAM, ELINOR A.; MD, 1970, UNIVERSITY OF ROCHESTER; MPH, 1993, JOHNS HOPKINS UNIVERSITY; general pediatrics
- HOHL, THOMAS H.; DDS, 0, LOYOLA UNIVERSITY (CHICAGO); oral and maxillofacial surgery
- HUANG, GREG J.; DMD, 1987, UNIVERSITY OF FLORIDA; MSD, 1989, UNIVERSITY OF WASHINGTON; Stability of Anterior Open-bite Orthodontic Outcomes Temporomandibular Disorder
- HUEBNER, COLLEEN ELLEN; PhD, 1991, UNIVERSITY OF WASHINGTON; the social bases of developmental problems in early childhood
- JACKSON, DOUGLASS L.; PhD, 1996, UNIVERSITY OF MINNESOTA; the peripheral regulation of sensory neurons during tissue injury
- JOHNSON, BARTON S.; DDS, 1985, UNIVERSITY OF CALIFORNIA (LOS ANGELES); MS, 1989, UNIVERSITY OF CALIFORNIA (LOS ANGELES); hospital dentistry, medical compromise, oncology, sedation, pharmacology, molecular biology
- JOHNSON, JAMES D.; DDS, 1969, NORTHWESTERN UNIVERSITY; MS, 1985, NORTHWESTERN UNIVERSITY; Surgical and nonsurgical endodontics, pulpal / periradicular biology and pathology, instrumentation
- JOONDEPH, DONALD R.; DDS, 1967, NORTHWESTERN UNIVERSITY; MS, 1969, NORTHWESTERN UNIVERSITY; orthodontics
- KARL, HELEN W.; MD, 1976, UNIVERSITY OF VIRGINIA; pediatric anesthesiology
- KIM, SARA; PhD, 1999, UNIVERSITY OF WASHINGTON; educational technology
- KINNEY, LISA A.; DDS, 1982, CASE WESTERN RESERVE UNIVERSITY; oral and maxillofacial surgery
- LEPE, XAVIER; DDS, 1980, UNIVERSITY OF GUADALAJARA (MEXICO); MS, 1987, LOYOLA UNIVERSITY (CHICAGO); dental materials
- LEROUX, BRIAN; PhD, 1989, UNIVERSITY OF BRITISH COLUMBIA (CANADA); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology
- LIBMAN, WARREN J.; DDS, 1986, MCGILL UNIVERSITY (CANADA); MSD, 1990, UNIVERSITY OF WASHINGTON; restorative dentistry, fixed prosthodontics
- MARTIN, MICHAEL D.; PhD, 1993, UNIVERSITY OF WASHINGTON; dental education in oral health care of persons with disability

O'NEAL, ROBERT B.; MED, 1971, WAYNE STATE UNIVERSITY; DMD, 1971, UNIVERSITY OF SOUTH CAROLINA; periodontics

OSTLUND, LYLE E; PhD, 1993, JOHNS HOPKINS UNIVERSITY; restorative dentistry.

OVIIR, TIINA; DDS, 1986, UNIVERSITY OF TARTU (ESTONIA); biology and mechano-sensory system of pulp-dentin complex, dentinal (bone) fluid

PETERSON, DEVEREAUX; PhD, 1980, UNIVERSITY OF PITTSBURGH; pediatric dentistry, educational administration, dental treatment for medically compromised patients

PITTS, DAVID LEROY; DDS, 1972, INDIANA UNIVERSITY; MSD, 1977, UNIVERSITY OF WASHINGTON; endodontics.

RAIGRODSKI, ARIEL J; DMD, 1991, HEBREW UNIVERSITY (ISRAEL); MS, 1999, LOUISIANA STATE UNIVERSITY; Esthetic & implant dentistry, CAD/CAM & zirconia-based systems & computerized shade matching

ROBERTS, FRANK A.; PhD, 1996, UNIVERSITY OF ALABAMA; immunological and biochemical regulatory mechanisms of inflammatory periodontal disease progression

ROBINS, LYNNE S; PhD, 1990, UNIVERSITY OF MICHIGAN; cultural competence, physician-patient communication, qualitative research assessment

ROSE, TIMOTHY M; PhD, 1981, UNIVERSITY OF GENEVA (SWITZERLAND); molecular biology of tumor viruses, cell growth, differentiation, and transformation

SCHAAD, DOUGLAS C.; PhD, 1986, UNIVERSITY OF WASHINGTON; Medical education and evaluation; educational assessment; salmonid recovery; riparian restoration

SCHWEDHELM, ERNESTO R.; MSD, 1983, INDIANA UNIVERSITY; tooth fracture, restoration of endodontic-treated teeth, laboratory procedures, treatment planning

SOMMERS, EARL E; DDS, 1971, INDIANA UNIVERSITY; diagnosis/management of orofacial pain, stomatitis, salivary gland disorders and dental management

TOOLSON, LEIGH; DDS, 1967, UNIVERSITY OF WASHINGTON; MSD, 1977, UNIVERSITY OF WASHINGTON; removable prosthodontics.

VERHOEF, DOUGLAS R; DDS, 1973, UNIVERSITY OF WASHINGTON; DObst, 1973, UNIVERSITY OF WASHINGTON; fixed prosthodontics

VICINI, PAOLO; PhD, 1996, POLYTECHNIC OF MILAN (ITALY); biomathematics and modeling methodology, mathematical models of biological systems

WANG, I-CHUNG; DDS, 1985, CHUNG SHAN MEDICAL UNIVERSITY (TAIWAN); MPH, 1992, UNIVERSITY OF ALABAMA; MS, 1995, UNIVERSITY OF ALABAMA; periodontal regeneration, epidemiology, and dental implantology

WELLS, NORMA J.; MPH, 1966, UNIVERSITY OF CALIFORNIA (LOS ANGELES); oral health promotion, dental caries, dental hygiene education

WRIGHT, JEFFREY A.; MD, 1978, UNIVERSITY OF MISSOURI; general pediatrics

Research Associate Professor

CANGELOSI, GERARD A.; PhD, 1984, UNIVERSITY OF CALIFORNIA (DAVIS); molecular biology of tuberculosis

MANCL, LLOYD A.; PhD, 1992, UNIVERSITY OF WASHINGTON; statistical methodology in periodontal disease, TMD, and correlated data

PERSSON, RIGMOR E.; DDS, 1969, UNIVERSITY OF LUND (SWEDEN); MSD, 1989, UNIVERSITY OF WASHINGTON; oral health, geriatric and medically compromised patients, general dentistry

PRESLAND, RICHARD B; PhD, 1987, UNIVERSITY OF ADELAIDE (AUSTRALIA); epithelial/epidermal differentiation, genetic diseases, regulation of development

Assistant Professor

ALCALDE, RAFAEL; DDS, 1990, CENTRAL UNIVERSITY (VENEZUELA); Orthognathic and Reconstructive Maxillofacial Surgery

CRINZI, RICHARD A; DDS, 1972, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery.

DRANGSHOLT, MARK T.; DDS, 1984, UNIVERSITY OF WASHINGTON; MPH, 1992, UNIVERSITY OF WASHINGTON; epidemiology

LEE, JESSICA J.; DDS, 1995, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery

MASSOTH, DONNA L; PhD, 1992, UNIVERSITY OF WASHINGTON; chronic pain, illness behavior, somitization

MIDDAUGH, DAN; DDS, 1961, UNIVERSITY OF MINNESOTA; MPA, 1972, UNIVERSITY OF WASHINGTON; oral medicine.

OVIIR, TIINA; DDS, 1986, UNIVERSITY OF TARTU (ESTONIA); biology and mechano-sensory system of pulp-dentin complex, dentinal (bone) fluid

PHILLIPS, KEITH M.; DMD, 1987, UNIVERSITY OF PENNSYLVANIA; MSD, 1991, UNIVERSITY OF WASHINGTON; restorative dentistry, fixed prosthodontics, implants

POPOWICS, TRACY; PhD, 1997, BROWN UNIVERSITY; dental biomechanics, craniofacial biology

SHERMAN, JEFFREY J.; PhD, 1998, UNIVERSITY OF KENTUCKY; Etiology, maintenance and treatment of chronic pain Posttraumatic stress disorder

Research Assistant Professor

CHUNG, WHASUN O.; PhD, 1999, UNIVERSITY OF WASHINGTON; oral microbiology and defensin antimicrobial peptides

FATHERAZI, SAHBA; PhD, 1979, UNIVERSITY OF LONDON (UK); signaling pathway in salivary gland and epithelial cell

RIEDY, CHRISTINE A; PhD, 1997, UNIVERSITY OF WASHINGTON; children's oral health - cultural diversity, dietary influences; symptom self-report in children

Lecturer

GOVIN, GLENN M.; DDS, 1985, UNIVERSITY OF TEXAS (SAN ANTONIO); MPH, 1992, UNIVERSITY OF TEXAS (HOUSTON); dental education in oral health care of persons with disabilities

STODDARD, JAMES W; DDS, 1961, UNIVERSITY OF WASHINGTON; restorative dentistry, operative dentistry

STRAND, HARVEY A; DDS, 1957, UNIVERSITY OF WASHINGTON; restorative dentistry

TOWNSEND, JOHN D; DDS, 1967, MCGILL UNIVERSITY (CANADA); MSD, 1973, UNIVERSITY OF WASHINGTON; restorative dentistry, fixed prosthodontics, periodontics, implants

Instructor

KAY, MICHAEL A; DDS, 1987, NORTHWESTERN UNIVERSITY; hospital-based dentistry

NIEMAN, ROBERT K; DDS, 1979, UNIVERSITY OF WASHINGTON; hospital-based dentistry

College of Education

Professor

- ABBOTT, ROBERT D; PhD, 1970, UNIVERSITY OF WASHINGTON; measurement, statistics and research design
- AFFLECK, JAMES Q; MA, 1963, SAN FRANCISCO STATE; EdD, 1968, COLUMBIA UNIVERSITY; special education (severely handicapped).
- ANDERSON, ROBERT A; PhD, 1964, UNIVERSITY OF MINNESOTA; educational administration
- BANKS, JAMES A; PhD, 1969, MICHIGAN STATE UNIVERSITY; social studies, multiethnic education
- BERNINGER, VIRGINIA WISE; PhD, 1981, JOHNS HOPKINS UNIVERSITY; educational psychology
- BOLTON, DALE LEROY; PhD, 1958, UNIVERSITY OF WISCONSIN; educational administration
- BOROUGHES, HOMER; PhD, 1949, UNIVERSITY OF WASHINGTON; history and philosophy of education.
- BRAMMER, LAWRENCE M; PhD, 1950, STANFORD UNIVERSITY; counseling, adult development.
- BROWN, FRANCES A; MA, 1950, COLUMBIA UNIVERSITY; business education.
- BURGESS, CHARLES O; PhD, 1962, UNIVERSITY OF WISCONSIN; history of education
- CATALANO, RICHARD F; PhD, 1982, UNIVERSITY OF WASHINGTON; crime, violence and drug abuse prevention, promotion of positive youth development
- CAUCE, ANA MARI; PhD, 1984, YALE UNIVERSITY; at-risk children, adolescents, and families; normative development in ethnic minority youth
- DOI, JAMES I; PhD, 1952, UNIVERSITY OF CHICAGO; finance and management of colleges and universities.
- DRISCOLL, JOHN P; PhD, 1957, PENNSYLVANIA STATE UNIVERSITY; educational communications
- EDGAR, EUGENE BAYARD; PhD, 1972, GEORGE PEABODY COLLEGE; special education
- EVANS, ELLIS D; EdD, 1964, INDIANA UNIVERSITY; human development and cognition
- FORSTER, JERALD R.; PhD, 1966, UNIVERSITY OF MINNESOTA; counseling
- FREEHILL, MAURICE F; EdD, 1948, STANFORD UNIVERSITY; school psychology/human development and cognition
- GAY, GENEVA; PhD, 1972, UNIVERSITY OF TEXAS (AUSTIN); general curriculum theory, multicultural education, and educating African American students
- GOODLAD, JOHN I; PhD, 1949, UNIVERSITY OF CHICAGO; education reform, curriculum theory
- HARING, NORRIS GROVER; EdD, 1956, SYRACUSE UNIVERSITY; special education (early childhood)
- HAWKINS, JOHN D; PhD, 1975, NORTH-WESTERN UNIVERSITY; crime and delinquency, substance abuse, social development, research, prevention
- HUNKINS, FRANCIS PETER; PhD, 1966, KENT STATE UNIVERSITY; curriculum
- JAROLIMEK, JOHN; PhD, 1955, UNIVERSITY OF MINNESOTA; social studies
- JENKINS, JOSEPH R; PhD, 1967, UNIVERSITY OF MINNESOTA; special education (mildly handicapped).
- KALTSOUNIS, THEODORE; PhD, 1961, UNIVERSITY OF ILLINOIS; social studies
- KNAPP, MICHAEL S.; PhD, 1981, STANFORD UNIVERSITY; public policy in education; policy research; sociology of education
- KUHL, PATRICIA K; PhD, 1973, UNIVERSITY OF MINNESOTA; speech perception.
- LOVITT, THOMAS C; EdD, 1966, UNIVERSITY OF KANSAS; special education (mildly handicapped)
- LOWENBRAUN, SHEILA; PhD, 1969, COLUMBIA UNIVERSITY; special education (hearing impaired)
- MADSEN, DAVID L; PhD, 1961, UNIVERSITY OF CHICAGO; history of education
- MC CARTIN, ROSEMARIE E; PhD, 1964, UNIVERSITY OF SOUTHERN CALIFORNIA; school psychology/human development and cognition.
- MCCUTCHEN, DEBORAH ELAINE; PhD, 1985, UNIVERSITY OF PITTSBURGH; cognitive processes underlying reading and writing skills.
- MELTZOFF, ANDREW N; PhD, 1976, OXFORD UNIVERSITY (UK); perceptual, cognitive and social development in infants
- MORISHIMA, JAMES K; PhD, 1967, UNIVERSITY OF WASHINGTON; measurement and evaluation
- NEEL, RICHARD S; PhD, 1972, UNIVERSITY OF SOUTHERN CALIFORNIA; special education (behavior disorders, learning disabilities); education (social behavior)
- NOLEN, SUSAN B.; PhD, 1986, PURDUE UNIVERSITY; achievement motivation in educational settings, development of motivation
- OLSTAD, ROGER G; PhD, 1963, UNIVERSITY OF MINNESOTA; science education, teacher education
- OLSWANG, STEVEN G; PhD, 1977, UNIVERSITY OF WASHINGTON; law and education
- PECK, CHARLES A; PhD, 1984, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); Teacher education, special education
- PECKHAM, PERCY D; PhD, 1968, UNIVERSITY OF COLORADO (DENVER); measurement, statistics and research design.
- RYCKMAN, DAVID B; EdD, 1966, UNIVERSITY OF ILLINOIS; special education (mildly handicapped)
- SCHWARTZ, ILENE SHARON; PhD, 1989, UNIVERSITY OF KANSAS; early childhood, autism, classroom-based interventions, and applied behavior analysis
- SEBESTA, SAM L; EdD, 1963, STANFORD UNIVERSITY; reading/language arts
- THOMPSON, MARIE D; PhD, 1970, UNIVERSITY OF WASHINGTON; special education (hearing impaired).
- TOSTBERG, ROBERT E; PhD, 1960, UNIVERSITY OF WISCONSIN; philosophy of education
- VALENCIA, SHEILA DENISE W; PhD, 1978, UNIVERSITY OF COLORADO (BOULDER); reading remediation, comprehension, instruction and assessment
- WASLEY, PATRICIA A; EdD, 1989, UNIVERSITY OF WASHINGTON; school renewal, whole-school change, teacher and administrative change, teacher education
- WHITE, OWEN R; PhD, 1971, UNIVERSITY OF OREGON; special education (severely handicapped)
- WILLIAMS, DONALD T; PhD, 1963, STANFORD UNIVERSITY; higher education
- WILLIAMS, RICHARD C.; PhD, 1966, UNIVERSITY OF MINNESOTA; career socialization of school principals; the process of school reform

Research Professor

- HILL, PAUL T.; PhD, 1972, OHIO STATE UNIVERSITY; political science, public policy, effects of regulation, especially on schools

Associate Professor

- ANTONY, JAMES SOTO; PhD, 1996, UNIVERSITY OF CALIFORNIA (LOS ANGELES); identifying the factors that influence aspirations and success of professional occupations
- BEAL, JACK L; PhD, 1972, UNIVERSITY OF NEBRASKA; secondary mathematics education.
- BELL, PHILIP L; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); cognition and learning, science education, argumentation, design of learning technologies
- BROWN, ROBERT LEWIS; EdD, 1961, UNIVERSITY OF ARKANSAS; school psychology.
- CHENEY, DOUGLAS A.; PhD, 1992, UNIVERSITY OF WASHINGTON; education, treatment and support of

students with behavioral/learning disabilities
DIMMITT, NORMA M; MED, 1963, UNIVERSITY OF WASHINGTON; EdD, 1970, STANFORD UNIVERSITY; curriculum and instruction, teacher education
GRAY, CAROLA; PhD, 1971, UNIVERSITY OF WASHINGTON; school psychology/human development and cognition
HANSEN-KRENING, NANCY M; PhD, 1974, UNIVERSITY OF OREGON; reading/language arts
HERRENKOHL, LESLIE R.; PhD, 1995, CLARKSON UNIVERSITY; cognitive and social processes of students in pre-school and elementary school settings
KAZEMI, ELHAM; PhD, 1999, UNIVERSITY OF CALIFORNIA (LOS ANGELES); sociocultural analyses of learning, mathematics education, teacher education, school reform
KELLY, SAMUEL E; PhD, 1971, UNIVERSITY OF WASHINGTON; educational leadership and policy study, higher education
MAZZA, JAMES J.; PhD, 1993, UNIVERSITY OF WISCONSIN; educational psychology/child and adolescent mental health
NELSON, MARY LEE; PhD, 1989, UNIVERSITY OF OREGON; counseling, interpersonal theory, process research, supervision, gender issues
NOLEN, PATRICIA A; PhD, 1970, UNIVERSITY OF WASHINGTON; school psychology/human development and cognition.
PLECKI, MARGARET L; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); school finance, economics of education, policy analysis, school choice, study of education reform

PORTIN, BRADLEY S; MED, 1987, SEATTLE PACIFIC UNIVERSITY; DPhil, 1995, OXFORD UNIVERSITY (UK); educational leadership, principalship, education policy and politics, and comparative education
SANDALL, SUSAN R.; PhD, 1986, UNIVERSITY OF WASHINGTON; effective intervention practices for very young children with disabilities
SMITH, JOHN P; EdD, 1969, STANFORD UNIVERSITY; science education
STAGE, SCOTT A.; PhD, 1991, FLORIDA STATE UNIVERSITY; educational psychology
STEVENS, REED R.; PhD, 1999, UNIVERSITY OF CALIFORNIA (BERKELEY); ethnography research on cognition, learning, social interaction, and technology use
THALBERG, STANTON P; PhD, 1964, UNIVERSITY OF IOWA; school psychology
TROIA, GARY A; PhD, 1999, UNIVERSITY OF MARYLAND; oral and written language development, disabilities, assessment, and intervention
VASQUEZ, JAMES A; PhD, 1973, UNIVERSITY OF CALIFORNIA (LOS ANGELES); learning (minority youth)/bilingual education.
WINEBURG, SAMUEL S.; PhD, 1990, STANFORD UNIVERSITY; educational psychology, cognitive psychology of school subjects, historical cognition

Research Associate Professor

BROWN, SHARAN E; PhD, 1991, UNIVERSITY OF WASHINGTON; educational law
COHEN, MARILYN; PhD, 1975, UNIVERSITY OF WASHINGTON; childhood

development, telecommunications technology and research
FREY, KARIN S.; PhD, 1978, UNIVERSITY OF WASHINGTON; social-emotional development, adult-child and peer interaction, motivation, teacher development

Assistant Professor

BASHEY, HUSAIN ISMAIL; PhD, 1975, UNIVERSITY OF OREGON; counseling.
HORN, ILANA SEIDEL; PhD, 2002, UNIVERSITY OF CALIFORNIA (BERKELEY); Secondary mathematics education
KIMBALL, KATHLEEN L.; EdD, 1993, UNIVERSITY OF WASHINGTON; school leadership, assessment and accountability, program evaluation, education reform
STONE, JENNIFER C.; PhD, 2003, UNIVERSITY OF WISCONSIN; literacy education and new technologies
STRITIKUS, TOM; PhD, 2000, UNIVERSITY OF CALIFORNIA (BERKELEY); second language development, ESL/bilingual education, literacy, education policy
VARGHESE, MANKA M.; PhD, 2000, UNIVERSITY OF PENNSYLVANIA; ESL/bilingual education, applied linguistics, teacher education for ESL/bilingual teachers

Lecturer

BRANDL, KLAUS K; PhD, 1991, UNIVERSITY OF TEXAS (AUSTIN); foreign language pedagogy, applied linguistics, foreign language teacher training

College of Engineering

Aeronautics and Astronautics

Professor

BOLLARD, R JOHN; PhD, 1954, PURDUE UNIVERSITY; mechanics of materials, structural mechanics, aeroelasticity, design and crash-worthiness of aircraft

BRUCKNER, ADAM; PhD, 1972, PRINCETON UNIVERSITY; space systems, propulsion, hypervelocity accelerators, energy conservation astrophysics

CHRISTIANSEN, WALTER H; PhD, 1961, CALIFORNIA INSTITUTE OF TECHNOLOGY; gas dynamics and gas physics, high-power gas lasers and their application, energy conversion

CLARK, ROBERT N; PhD, 1969, STANFORD UNIVERSITY; automatic control systems, fault detection in dynamic systems

DECHER, REINER; PhD, 1968, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; aircraft propulsion, fluid mechanics, energy conversion

EASTMAN, FRED; MS, 1929, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; aeronautics and astronautics

FYFE, IAN M; PhD, 1957, STANFORD UNIVERSITY; dynamics, wave propagation in solids and fluids

HOFFMAN, ALAN LOWELL; PhD, 1967, CALIFORNIA INSTITUTE OF TECHNOLOGY; plasma physics and magnetic confinement fusion

HOLSAPPLE, KEITH A; PhD, 1965, UNIVERSITY OF WASHINGTON; solid mechanics, continuum mechanics, structure waves, finite element methods.

JARBOE, THOMAS R.; PhD, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); plasma physics and controlled fusion, magnetic reconnection and relaxation

JOPPA, ROBERT G; PhD, 1972, PRINCETON UNIVERSITY; aircraft flight mechanics, stability and control, V/STOL testing, airplane design, flight testing

LIN, KUEN-YUAN; PhD, 1977, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; composite materials, structural mechanics, finite element methods

LIVNE, ELI; PhD, 1990, UNIVERSITY OF CALIFORNIA (LOS ANGELES); multidisciplinary design, aeroelasticity, aeroservoelasticity, optimization, structural dynamics

PARMERTER, R REID; PhD, 1963, CALIFORNIA INSTITUTE OF TECHNOLOGY; structures, solid mechanics, fracture mechanics.

PEARSON, CARL E; PhD, 1949, BROWN UNIVERSITY; wave propagation, fluid dynamics, numerical analysis, optimization

RUSSELL, DAVID A; PhD, 1961, CALIFORNIA INSTITUTE OF TECHNOLOGY; fluid mechanics and gas physics, aerodynamics, shock processes and laser fluid dynamics

VAGNERS, JURIS; PhD, 1967, STANFORD UNIVERSITY; optimal control and estimation theory, applications to aircraft systems

Associate Professor

MATTICK, ARTHUR T.; PhD, 1975, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; gas physics, gas lasers, energy conversion, propulsion

SHUMLAK, URI; PhD, 1992, UNIVERSITY OF CALIFORNIA (BERKELEY); computational fluid dynamics, parallel computing, plasma physics, magneto-hydrodynamics, and electri

Assistant Professor

CAMPBELL, MARK E.; PhD, 1996, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; precision controlled structures, autonomous aerospace vehicles, smart materials

Bioengineering

Professor

AUTH, DAVID C; PhD, 1969, GEORGETOWN UNIVERSITY; lasers and electro-optical system design, electrophysics, medical instrumentation

CASTNER, DAVID G.; PhD, 1979, UNIVERSITY OF CALIFORNIA (BERKELEY); polymer surfaces, metal-organic interfaces, catalytic materials

HOFFMAN, ALLAN S; DSc, 1957, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; synthesis, characterization, and biological interaction of biomaterials, mechanics of natural tissue

HORBETT, THOMAS A; PhD, 1970, UNIVERSITY OF WASHINGTON; interfacial proteins, cell interactions, foreign body reaction, nonfouling surfaces

HUNTSMAN, LEE L; PhD, 1968, UNIVERSITY OF PENNSYLVANIA; mechanics of heart and heart muscle, cardiovascular system assessment, new measurement techniques

KIM, YONGMIN; PhD, 1982, UNIVERSITY OF WISCONSIN; computer architecture, imaging systems, medical imaging, computer graphics, multimedia, home healthcare

RATNER, BUDDY D; PhD, 1972, POLYTECHNIC INSTITUTE OF BROOKLYN; synthesis and characterization of polymeric biomaterials

SPELMAN, FRANCIS A; PhD, 1975, UNIVERSITY OF WASHINGTON; biophysics of implanted cochlea, bioinstrumentation for primate research

VINEY, CHRISTOPHER; PhD, 0, CAMBRIDGE UNIVERSITY (UK); phase transformations and microstructure/property relationships in polymers and liquid crystals

VOGEL, VIOLA; Doctor of Natural Philosophy, 1987, JOHANN WOLFGANG GOETHE UNIV (GERMANY); molecular assemblies and Langmuir-Blodgett films, liquid interfaces, non-linear optics, microscopy

Research Professor

CRUM, LAWRENCE A.; PhD, 1967, OHIO UNIVERSITY; physical acoustics, underwater acoustics, medical ultrasound, acoustic cavitation, sonoluminescence,

Associate Professor

BURNS, DAVID H; PhD, 1984, UNIVERSITY OF WASHINGTON; non-invasive spectroscopic measurements of metabolism

SANDERS, JOAN ELIZABETH; PhD, 1991, UNIVERSITY OF WASHINGTON; soft tissue biomechanics and tissue adaptation to mechanical stress

Assistant Professor

PUN, SUZIE H; PhD, 2000, CALIFORNIA INSTITUTE OF TECHNOLOGY; Macromolecule transport; non-viral gene delivery; intracellular trafficking

Research Assistant Professor

HARRIS, SAMANTHA PAIGE; PhD, 1994, UNIVERSITY OF MICHIGAN; Regulation of cardiac contraction, muscle mechanics, molecular basis of inherited cardiomyopathies

Chemical Engineering

Professor

BABB, ALBERT L; PhD, 1951, UNIVERSITY OF ILLINOIS; reactor engineering, bioengineering

BANEYX, FRANCOIS; PhD, 1991, UNIVERSITY OF TEXAS (AUSTIN); biotechnology, protein technology, biochemical engineering

BERG, JOHN C.; PhD, 1964, UNIVERSITY OF CALIFORNIA (BERKELEY); interfacial phenomena, surface and colloid science

BOWEN, J RAY; PhD, 1963, UNIVERSITY OF CALIFORNIA (BERKELEY); combustion

DAVID, MORTON; Doctor of English, 1950, YALE UNIVERSITY; chemical engineering

DAVIS, E JAMES; PhD, 1960, UNIVERSITY OF WASHINGTON; transport in porous media, microparticle physics and chemistry, surface and colloid science

FINLAYSON, BRUCE A.; PhD, 1965, UNIVERSITY OF MINNESOTA; modeling of chemical engineering problems

GARLID, KERMIT L.; PhD, 1961, UNIVERSITY OF MINNESOTA; nuclear fuel cycles, radioactive waste management

HEIDEGER, WILLIAM J.; PhD, 1959, PRINCETON UNIVERSITY; biomedical transport phenomena

JOHANSON, LENNART N.; PhD, 1948, UNIVERSITY OF WISCONSIN; chemical engineering

LIDSTROM, MARY E.; PhD, 1977, UNIVERSITY OF WISCONSIN; biomolecular engineering, metabolic engineering, bioremediation

RIBE, FRED L.; PhD, 1951, UNIVERSITY OF CHICAGO; experimental and theoretical plasma physics, fusion reactor studies

RICKER, NEIL L.; PhD, 1978, UNIVERSITY OF CALIFORNIA (BERKELEY); process control and optimization

ROGERS, J. WILLIAM; PhD, 1979, UNIVERSITY OF TEXAS (AUSTIN); surface chemistry and engineering, applications to thin film deposition

SCHWARTZ, DANIEL T.; PhD, 1989, UNIVERSITY OF CALIFORNIA (DAVIS); electrochemical and environmental engineering

SLEICHER, CHARLES A.; PhD, 1955, UNIVERSITY OF MICHIGAN; fluid mechanics, heat transfer

STUVE, ERIC M.; PhD, 1983, STANFORD UNIVERSITY; electrochemical surface science, fuel cell engineering

WOODRUFF, GENE L.; PhD, 1965, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; reactor physics, fusion engineering, neutron spectroscopy, energy studies

YAGER, PAUL; PhD, 1980, UNIVERSITY OF OREGON; physical chemistry, applications of biomembranes, biosensors, microfluidics, biomedical diagnostic i

Associate Professor

HOLT, BRADLEY R.; PhD, 1984, UNIVERSITY OF WISCONSIN; process design and control

JIANG, SHAOYI; PhD, 1993, CORNELL UNIVERSITY; molecular simulation, statistical mechanics, and scanning probe microscopy

KRIEGER-BROCKETT, BARBARA; PhD, 1976, WAYNE STATE UNIVERSITY; reaction engineering, chemical kinetics and catalysis simulation

OVERNEY, RENE M.; PhD, 1992, UNIVERSITY OF BASEL (SWITZERLAND);

nanoscale surface science and polymer rheology

Assistant Professor

HAYES, BRIAN; PhD, 1997, UNIVERSITY OF WASHINGTON; polymers and fiber-reinforced composites in aerospace and sporting goods industries

PUN, SUZIE H.; PhD, 2000, CALIFORNIA INSTITUTE OF TECHNOLOGY; Macromolecule transport; non-viral gene delivery; intracellular trafficking

Civil and Environmental Engineering

Professor

BENJAMIN, MARK M.; PhD, 1979, STANFORD UNIVERSITY; chemistry of natural waters, chemical and biological treatment of water and wastewater.

BOGAN, RICHARD H.; DSc, 1954, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; water and air resources, environmental engineering.

BROWN, COLIN B.; PhD, 1962, UNIVERSITY OF MINNESOTA; structural engineering and systems

BUCKNAM, RONALD E.; PhD, 1964, UNIVERSITY OF ILLINOIS; Professional Engineering Practice Liaison (PEPL)

BURGES, STEPHEN J.; PhD, 1970, STANFORD UNIVERSITY; surface and ground water hydrology, water resource systems analysis and design

CARLSON, DALE A.; PhD, 1960, UNIVERSITY OF WISCONSIN; water resources and solid-waste management

COLCORD, J E; MSCE, 1949, UNIVERSITY OF MINNESOTA; surveying engineering.

EBERHARD, MARC O.; PhD, 1989, UNIVERSITY OF ILLINOIS; structural analysis and design, reinforced concrete, earthquake engineering, nondestructive testing

ELIAS, ZIAD; DSc, 1963, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; engineering mechanics.

EVANS, ROGER J.; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); engineering mechanics, structural engineering

FERGUSON, JOHN F.; PhD, 1970, STANFORD UNIVERSITY; chemical and biological processes in water and waste treatment and in natural water systems

HAMMER, VERNON B; MS, 1941, HARVARD UNIVERSITY; solid-waste management.

HARTZ, BILLY J; PhD, 1955, UNIVERSITY OF CALIFORNIA (BERKELEY); engineering mechanics, structural mechanics

JACOBY, JEAN M.; PhD, 1986, UNIVERSITY OF WASHINGTON; applied

aquatic ecology and restoration; water quality management

LARSON, TIMOTHY; PhD, 1976, UNIVERSITY OF WASHINGTON; airborne particles, air quality modeling, and instrument development

LETTENMAIER, DENNIS P; PhD, 1975, UNIVERSITY OF WASHINGTON; systems analysis and water resources planning.

LINDELL, L. TOMMY; PhD, 1974, UNIVERSITY OF UPPSALA (SWEDEN); environmental engineering

MAHONEY, JOE PAUL; PhD, 1979, TEXAS A&M UNIVERSITY; construction materials, pavement systems, airport design

MANNING, FRED L.; PhD, 1983, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; traffic flow theory, networks, econometric methods, equilibration in transportation markets

MATTOCK, ALAN; PhD, 1955, UNIVERSITY OF LONDON (UK); structural behavior and design

MORGAN, MICHAEL S; DSc, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; applied respiratory, physiology and inhalation toxicology.

NECE, RONALD E; DSc, 1958, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; hydraulic and coastal engineering

REED, DOROTHY; PhD, 1980, PRINCETON UNIVERSITY; structural and wind engineering

REIBER, STEVE H.; PhD, 1983, UNIVERSITY OF UTAH; environmental engineering

RICHEY, JEFFREY E; PhD, 1973, UNIVERSITY OF CALIFORNIA (DAVIS); quantitative problems of aquatic ecosystems, primary Amazon River, limnology

ROSSANO, AUGUST T; MS, 1941, HARVARD UNIVERSITY; DSc, 1954, HARVARD UNIVERSITY; air resources.

RUTHERFORD, G SCOTT; PhD, 1974, NORTHWESTERN UNIVERSITY; transportation planning and engineering, transit planning, demand forecasting

SCHNEIDER, JERRY; PhD, 1966, UNIVERSITY OF PENNSYLVANIA; metropolitan area and regional planning, transportation and other urban models.

SEABLOOM, ROBERT; MSCE, 1956, UNIVERSITY OF WASHINGTON; water-quality and solid-waste management

STEINEMANN, ANNE; PhD, 1993, STANFORD UNIVERSITY; Water, Drought, Environment, Climate Change, Health, Chemical Exposures, Public Economics, Sustainability

STENSEL, H. DAVID; PhD, 1971, CORNELL UNIVERSITY; biological wastewater treatment, fixed film reactors, mass transfer mechanics, modeling.

SYLVESTER, ROBERT O; MS, 1941, HARVARD UNIVERSITY; water resources.

TAWRESEY, JOHN G; MBA, 1975, UNIVERSITY OF WASHINGTON; structural engineering
TAWRESEY, JOHN G; MS, 1968, CORNELL UNIVERSITY; structural engineering
WELCH, EUGENE B; PhD, 1967, UNIVERSITY OF WASHINGTON; water resources and aquatic biology
WOOD, ERIC F.; DSc, 1974, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; environmental engineering
YEH, HARRY H; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); fluid mechanics, water wave motions, coastal and hydraulic engineering.

Research Professor

BOOTH, DEREK B; PhD, 1984, UNIVERSITY OF WASHINGTON; Environmental geology, particularly human influences on hillslopes, runoff, and rivers.
COVERT, DAVID S; PhD, 1974, UNIVERSITY OF WASHINGTON; atmospheric chemistry; aerosol physics, chemistry, optics, and instrumentation
DAILEY, DANIEL J; PhD, 1988, UNIVERSITY OF WASHINGTON; time series modeling of physical phenomena, optimization, distributed computing, networking
STRAND, STUART E; PhD, 1982, PENNSYLVANIA STATE UNIVERSITY; forest biotechnology, environmental pollution control

Associate Professor

ARDUINO, PEDRO; PhD, 1996, GEORGIA INSTITUTE OF TECHNOLOGY; Mechanics of Porous Media, Constitutive Modeling of Soils, Numerical Methods of Geomechanics.
BRETT, MICHAEL T.; PhD, 1990, UNIVERSITY OF UPPSALA (SWEDEN); Eutrophication and food web and nutrient regulation of algal biomass and secondary production in lak
CHENOWETH, HARRY H; MSCE, 1957, UNIVERSITY OF WASHINGTON; engineering mechanics and hydraulic engineering.
JESSUP, ANDREW T.; PhD, 1990, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; applications of remote sensing to air-sea interaction
KENT, JOSEPH C; PhD, 1952, UNIVERSITY OF CALIFORNIA (BERKELEY); hydraulic engineering
KORSHIN, GREGORY; PhD, 1983, CHEMICAL ENGINEERING INSTITUTE (RUSSIA); Environmental chemistry and engineering, aquatic chemistry, generation of halogenated organic compou
MILLER, WILLIAM; MSCE, 1952, UNIVERSITY OF WASHINGTON; materials.
SNYDER, MARK B.; PhD, 1989, UNIVERSITY OF ILLINOIS; construction engineering

SPYRIDAKIS, DIMITRIS; PhD, 1965, UNIVERSITY OF WISCONSIN; soil and water chemistry
STRAUSSER, HOWARD; MSEng, 1950, JOHNS HOPKINS UNIVERSITY; hydraulic engineering
TURKIYYAH, GEORGE; PhD, 1990, CARNEGIE MELLON UNIVERSITY; computer-aided engineering, finite element modeling

Research Associate Professor

HORNER, RICHARD R.; PhD, 1978, UNIVERSITY OF WASHINGTON; Effects of human activities on water resources in urban areas.

Assistant Professor

LEHMAN, DAWN E; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Earthquake Engineering
MUENCH, STEPHEN T; PhD, 2004, UNIVERSITY OF WASHINGTON; Transportation construction, construction information, engineering training & education, pavements
PETROFF, CATHERINE; PhD, 1993, CALIFORNIA INSTITUTE OF TECHNOLOGY; sediment transport, coastal engineering, and environmental fluid mechanics
WANG, YINHAI; PhD, 1998, TSINGHUA UNIVERSITY (CHINA); Intelligent Transportation Systems, Traffic Detection Technologies, & Transportation Modeling.

Research Assistant Professor

MACKENZIE-HELNWEIN, PETER; PhD, 1997, VIENNA UNIVERSITY OF TECHNOLOGY; computational mechanics, constitutive modeling, structural stability, finite elements

Computer Science and Engineering

Professor

ANDERSON, RICHARD J.; PhD, 1985, STANFORD UNIVERSITY; educational technology, algorithms
ANDERSON, THOMAS E.; PhD, 1991, UNIVERSITY OF WASHINGTON; internetworking, local and wide area distributed systems, operating systems, computer architecture
BAER, JEAN-LOUP; PhD, 1968, UNIVERSITY OF CALIFORNIA (LOS ANGELES); computer architecture and performance evaluation
BORNING, ALAN H; PhD, 1979, STANFORD UNIVERSITY; human-computer interaction; constraint-based languages and systems
BORRIELLO, GAETANO; PhD, 1988, UNIVERSITY OF CALIFORNIA

(BERKELEY); invisible and ubiquitous computing, embedded and network systems

CHAMBERS, CRAIG D; PhD, 1992, STANFORD UNIVERSITY; programming language design, optimizing compilation, object-oriented systems
DE ROSE, ANTHONY DAVID; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); computer-aided geometric design and modeling, graphical user interfaces, high resolution graphics
EBELING, WILLIAM H.C.; PhD, 1986, CARNEGIE MELLON UNIVERSITY; VLSI architectures, configurable computing, computer-aided design
EGGERS, SUSAN JANE; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); uniprocessor and parallel architectures and program behavior, back-end compiler optimizations
ETZIONI, OREN; PhD, 1990, CARNEGIE MELLON UNIVERSITY; artificial intelligence and information retrieval, natural language interfaces, software agents
FELSENSTEIN, JOSEPH; PhD, 1968, UNIVERSITY OF CHICAGO; estimation of evolutionary trees, models of long-term evolutionary processes, and theoretical popula
FRIEDMAN, BATYA; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); value-sensitive design, social-cognitive and cultural aspects of information systems
GOLDE, HELLMUT; PhD, 1959, STANFORD UNIVERSITY; programming languages, programming systems, compilers, computer networks
GREEN, PHILIP; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); Mathematical and Computer Methods for Genome Analysis
HANKS, STEVEN JOHN; PhD, 1990, YALE UNIVERSITY; Artificial intelligence; decision-theoretic reasoning; e-commerce technologies; computer security
HOOD, LEROY E.; PhD, 1968, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution
KALET, IRA J; PhD, 1968, PRINCETON UNIVERSITY; computer simulation of radiation therapy, artificial intelligence, computer graphics
KARLIN, ANNA R.; PhD, 1987, STANFORD UNIVERSITY; online algorithms, probabilistic algorithms and probabilistic analysis
KAUTZ, HENRY; PhD, 1988, UNIVERSITY OF ROCHESTER; artificial intelligence, knowledge representation, decision-theoretic control of reasoning
KEHL, THEODORE; PhD, 1961, UNIVERSITY OF WISCONSIN; hardware design (VLSI), telephony and API programming
KIM, YONGMIN; PhD, 1982, UNIVERSITY OF WISCONSIN; computer architecture,

imaging systems, medical imaging, computer graphics, multimedia, home healthc

LADNER, RICHARD E; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); design and analysis of algorithms, data compression, network algorithms, cache performance

LAZOWSKA, EDWARD D; PhD, 1977, UNIVERSITY OF TORONTO (CANADA); computer systems: modeling and analysis, design and implementation, distributed and parallel systems

LEVY, HENRY M; MS, 1981, UNIVERSITY OF WASHINGTON; operating systems, distributed and parallel systems, Web systems and performance

NOTKIN, DAVID S; PhD, 1984, CARNEGIE MELLON UNIVERSITY; software engineering, software evolution, software tools and environments

OLSON, MAYNARD V.; PhD, 1970, STANFORD UNIVERSITY; Methods and applications of large-scale DNA analysis

OSTENDORF, MARI; PhD, 1985, STANFORD UNIVERSITY; Speech synthesis and understanding; spoken document retrieval; statistical pattern recognition.

RISKIN, EVE A; PhD, 1990, STANFORD UNIVERSITY; image compression and processing, and signal processing

RUZZO, WALTER L; PhD, 1978, UNIVERSITY OF CALIFORNIA (BERKELEY); computational biology

SHAPIRO, LINDA G.; PhD, 1974, UNIVERSITY OF IOWA; computer vision, multimedia information systems, medical infromatics, pattern recognition

SHAW, ALAN CARY; PhD, 1968, STANFORD UNIVERSITY; operating systems, software specifications, real-time systems

STUETZLE, WERNER; PhD, 1977, SWISS FEDERAL INSTITUTE OF TECHNOLOGY; nonparametric methods in multivariate analysis, statistical applications of computer graphics

TANIMOTO, STEVEN L; PhD, 1975, PRINCETON UNIVERSITY; visual languages, image analysis, computer graphics, artificial intelligence, educational technology

TARCZY-HORNOCH, PETER; MD, 1989, STANFORD UNIVERSITY; bioinformatics and clinical informatics: clinical systems and integrating genetic databases

TOMPA, MARTIN; PhD, 1978, UNIVERSITY OF TORONTO (CANADA); computational complexity, computational biology

WELD, DANIEL SABEY; PhD, 1988, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; artificial intelligence, intelligent user interfaces, software agents, planning

Research Professor

BRINKLEY III, JAMES F.; PhD, 1984,

STANFORD UNIVERSITY; computer applications in medicine and biology

Associate Professor

BERSHAD, BRIAN; PhD, 1990, UNIVERSITY OF WASHINGTON; operating systems, architecture, distributed systems, parallel systems

BILMES, JEFFREY A.; PhD, 1999, UNIVERSITY OF CALIFORNIA (BERKELEY); Speech & pattern recognition, learning, audio processing, high-performance computing, human-computer

BOHRINGER, KARL F.; PhD, 1997, CORNELL UNIVERSITY; microelectromechanical systems (MEMS), applied microtechnology, micro spacecraft, distributed/ubiqui

CURLESS, BRIAN L.; PhD, 1997, STANFORD UNIVERSITY; computer graphics; active machine vision

DIORIO, CHRISTOPHER J; PhD, 1997, CALIFORNIA INSTITUTE OF TECHNOLOGY; silicon learning chips, neural networks, and learning algorithms

DOMINGOS, PEDRO MORAIS DEL; PhD, 1997, UNIVERSITY OF CALIFORNIA (IRVINE); artificial intelligence, machine learning, data mining

FOX, DIETER; PHD, 1998, UNIVERSITY OF BONN (GERMANY); artificial intelligence and mobile robotics, probabilistic state estimation, particle filters

GRIBBLE, STEVEN; PhD, 2000, UNIVERSITY OF CALIFORNIA (BERKELEY); cluster computing, operating systems, Internet infrastructure and services, distributed computing

HAUCK, SCOTT; PhD, 1995, UNIVERSITY OF WASHINGTON; FPGAs, Reconfigurable Computing, VLSI/CAD, Digital Logic, Adaptive Computing.

JOHNSON, RONALD A.; MA, 1972, UNIVERSITY OF CHICAGO; MS, 1975, UNIVERSITY OF SOUTHERN CALIFORNIA; information sciences

LANDAY, JAMES A; PhD, 1996, CARNEGIE MELLON UNIVERSITY; Human-computer interaction, ubiquitous computing

NOBLE, WILLIAM S; PhD, 1998, UNIVERSITY OF CALIFORNIA (SAN DIEGO); the development of machine learning techniques for application to problems in molecular biology

POPOVIC, ZORAN; PhD, 1999, CARNEGIE MELLON UNIVERSITY; computer graphics, character animation, physically based modeling and modeling, simulation

SEITZ, STEVEN M.; PhD, 1997, UNIVERSITY OF WISCONSIN; computer vision, computer graphics

STIBER, MICHAEL D; PhD, 1992, UNIVERSITY OF CALIFORNIA (LOS ANGELES); dynamics of synaptic integration

SUCIU, DAN; PhD, 1995, UNIVERSITY OF

PENNSYLVANIA; databases, XML

WETHERALL, DAVID JAMES; PhD, 1998, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; networks and distributed systems

Assistant Professor

ARNSTEIN, LAWRENCE; PhD, 1993, CARNEGIE MELLON UNIVERSITY; ubiquitous computing, bioinformatics, embedded systems design

GROSSMAN, DANIEL JOSEPH; PhD, 2003, CORNELL UNIVERSITY; programming language design, theory, and implementation

GURUSWAMI, VENKATESAN; PhD, 2001, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; Theoretical computer science, coding theory, algorithms, complexity theory

MEILA-PREDOVICIU, MARINA; PhD, 1999, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; graphical probability models, machine learning, algorithms, data mining

NOBLE, WILLIAM S; PhD, 1998, UNIVERSITY OF CALIFORNIA (SAN DIEGO); the development of machine learning techniques for application to problems in molecular biology

PADMANABHAN, VENKATA N.Z.; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Internet performance analysis, wireless networking and mobile computing.

RAO, RAJESH P.N.; PhD, 1998, UNIVERSITY OF ROCHESTER; neural computing, machine vision and learning, robotics, computational neuroscience

Lecturer

MONES, BARBARA; MFA, 1989, RHODE ISLAND SCHOOL OF DESIGN; computer graphics, character animation

Electrical Engineering

Professor

ALBRECHT, ROBERT W; PhD, 1961, UNIVERSITY OF MICHIGAN; reactor dynamics and stochastic processes, innovative nuclear reactors, reactor instrumentation, rob

ALEXANDRO, FRANK J; MSEE, 1959, NEW YORK UNIVERSITY; DSc, 1964, NEW YORK UNIVERSITY; control systems, stochastic estimation methods

ALLSTOT, DAVID JAMES; PhD, 1979, UNIVERSITY OF CALIFORNIA (BERKELEY); Design and simulation of RF and mixed-signal integrated circuits. System-on-chip Solutions

ATLAS, LES EUGENE; PhD, 1984, STANFORD UNIVERSITY; time-frequency representations, digital signal processing applied to speech, audio, manufacturing

BERNARD, GARY D; PhD, 1964, UNIVERSITY OF WASHINGTON; advanced

- sensors for manufacturing, time-frequency classification, visual information processing
- BJORKSTAM, JOHN L.; PhD, 1958, UNIVERSITY OF WASHINGTON; materials science and engineering, fundamentals and technological applications of magnetic resonance
- CHIZECK, HOWARD JAY; DSc, 1982, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; Biologically inspired control systems for autonomous robotics, prosthetics, and rehabilitation.
- CLARK, ROBERT N.; PhD, 1969, STANFORD UNIVERSITY; automatic control systems, fault detection in dynamic systems
- DALTON, LARRY R.; PhD, 1971, HARVARD UNIVERSITY; materials chemistry focused on producing next generation opto-electronic materials
- DARLING, ROBERT B.; PhD, 1985, GEORGIA INSTITUTE OF TECHNOLOGY; semiconductor devices, solid state, optoelectronics, microelectronics.
- DOW, DANIEL G.; PhD, 1958, STANFORD UNIVERSITY; microwaves, physical electronics, semiconductor devices, sensors
- DUNHAM, SCOTT T.; PhD, 1985, STANFORD UNIVERSITY; Modeling and simulation of microfabrication processes and device behavior.
- EBELING, WILLIAM H.C.; PhD, 1986, CARNEGIE MELLON UNIVERSITY; VLSI architectures, configurable computing, computer-aided design
- EL-SHARKAWI, MOHAMED A.; PhD, 1980, UNIVERSITY OF BRITISH COLUMBIA (CANADA); analysis and control of power electronics, systems, and electric drives; artificial neural networks
- GUILFORD, EDWARD C.; PhD, 1959, UNIVERSITY OF CALIFORNIA (BERKELEY); electronics, computers
- HANNAFORD, BLAKE; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); haptic interfaces, robotics, biomechanics, bioengineering, controls, human-machine interaction
- HARALICK, ROBERT M.; PhD, 1969, UNIVERSITY OF KANSAS; computer vision, artificial intelligence, pattern recognition, image processing
- HSU, CHIH-CHI; PhD, 1951, OHIO STATE UNIVERSITY; control systems and cybernetics
- HUANG, XUECONG D.; PhD, 1989, UNIVERSITY OF EDINBURGH (UK); Speech recognition and synthesis, user interfaces, artificial intelligence, computational linguistic
- HWANG, JENQ-NENG; PhD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; parallel architectures, signal and image processing, neural networks
- ISHIMARU, AKIRA; PhD, 1958, UNIVERSITY OF WASHINGTON; electromagnetics, optics, acoustics, applied mathematics, scattering theory
- JOHNSON, DAVID L.; PhD, 1955, PURDUE UNIVERSITY; digital design, artificial intelligence, models of learning systems
- KIM, YONGMIN; PhD, 1982, UNIVERSITY OF WISCONSIN; computer architecture, imaging systems, medical imaging, computer graphics, multimedia, home healthc
- KUGA, YASUO; PhD, 1983, UNIVERSITY OF WASHINGTON; microwave and millimeter-wave remote sensing, optics, and electromagnetics
- LAURITZEN, PETER O.; PhD, 1961, STANFORD UNIVERSITY; power electronics, electronic devices, instrumentation
- LEWELLEN, THOMAS; PhD, 1972, UNIVERSITY OF WASHINGTON; bioengineering, electrical engineering
- LIU, CHEN-CHING; PhD, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); power system analysis/computing, intelligent system methodologies/ applications, power electronics
- MELDRUM, DEIRDRE R.; PhD, 1992, STANFORD UNIVERSITY; laboratory automation systems, genome analysis, modeling and control of dynamic systems, robots
- MORITZ, WILLIAM E.; PhD, 1969, STANFORD UNIVERSITY; human-powered transportation
- OSTENDORF, MARI; PhD, 1985, STANFORD UNIVERSITY; Speech synthesis and understanding; spoken document retrieval; statistical pattern recognition.
- PEDEN, IRENE CARSWELL; PhD, 1962, STANFORD UNIVERSITY; subsurface remote sensing and applied electromagnetics
- PORTER, ROBERT P.; PhD, 1970, NORTHEASTERN UNIVERSITY; acoustics, electromagnetics, signal processing
- RISKIN, EVE A.; PhD, 1990, STANFORD UNIVERSITY; image compression and processing, and signal processing
- RITCEY, JAMES A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (SAN DIEGO); communications, signal processing, radar/sonar
- ROY, SUMIT; PhD, 1988, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); Performance analysis of communications networks; statistical & numerical computing
- SAHR, JOHN D.; PhD, 1990, CORNELL UNIVERSITY; radar remote sensing, ionospheric physics; signal processing; wireless communications
- SHI, CHUAN JIN; PhD, 1994, UNIVERSITY OF WATERLOO (CANADA); VLSI and VLSI-CAD, optimization
- SIGELMANN, RUBENS A.; PhD, 1963, UNIVERSITY OF WASHINGTON; bioengineering, ultrasonics, propagation, acoustics.
- SPINDEL, ROBERT C.; PhD, 1971, YALE UNIVERSITY; ocean acoustics, signal processing, acoustic navigation systems, acoustic tomography
- SUN, MING-TING; PhD, 1985, UNIVERSITY OF CALIFORNIA (LOS ANGELES); multimedia/video processing/networking VLSI
- TSANG, LEUNG; PhD, 1976, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; wave propagation and scattering, remote sensing and optics
- YUAN, CHUN; PhD, 1988, UNIVERSITY OF UTAH; magnetic resonance imaging in medical application

Research Professor

- BEACH, KIRK WATSON; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); arterial disease in diabetes, blood flow studies with ultrasonic Doppler
- CRUM, LAWRENCE A.; PhD, 1967, OHIO UNIVERSITY; physical acoustics, underwater acoustics, medical ultrasound, acoustic cavitation, sonoluminescence,
- DAILEY, DANIEL J.; PhD, 1988, UNIVERSITY OF WASHINGTON; time series modeling of physical phenomena, optimization, distributed computing, networking
- WINEBRENNER, DALE P.; PhD, 1985, UNIVERSITY OF WASHINGTON; optical and radiowave propagation and scattering, remote sensing of planetary surfaces and subsurfa

Associate Professor

- BABBITT, WILLIAM R.; PhD, 1987, HARVARD UNIVERSITY; Optical memories, processors, and optical interconnects and nonlinear optics
- BERG, MARTIN C.; PhD, 1986, STANFORD UNIVERSITY; digital control system design, control of structurally flexible electromechanical systems
- BILMES, JEFFREY A.; PhD, 1999, UNIVERSITY OF CALIFORNIA (BERKELEY); Speech & pattern recognition, learning, audio processing, high-performance computing, human-computer
- BOHRINGER, KARL F.; PhD, 1997, CORNELL UNIVERSITY; microelectromechanical systems (MEMS), applied microtechnology, micro spacecraft, distributed/ubiqui
- CHOU, PHILIP A.; PhD, 1998, STANFORD UNIVERSITY; Compression and recognition of video images, audio, speech and documents.
- GIRI, JAY; PhD, 1977, CLARKSON UNIVERSITY; power system analysis, software development and user interfaces for real-time power system control
- HAUCK, SCOTT; PhD, 1995, UNIVERSITY OF WASHINGTON; FPGAs, Reconfigurable Computing, VLSI/CAD, Digital Logic, Adaptive Computing.
- HELMS, WARD J.; PhD, 1968, UNIVER-

SITY OF WASHINGTON; VLSI analog and digital circuit design, integrated circuits, acoustics and audio, silicon compilers

JANDHYALA, VIKRAM; PhD, 1998, UNIVERSITY OF ILLINOIS; Computational and Applied Electromagnetics, High-Speed Circuit Applications of Field Solvers.

LIN, LIH-YUAN; PhD, 1996, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Photonics and MEMS, for applications in advanced communications and biotechnology.

LIU, HUI; PhD, 1995, UNIVERSITY OF TEXAS (AUSTIN); Wireless system and network design: DSP and VLSI for communications, numerical computing; statistica

SINANAN, MIKA N.; PhD, 1986, UNIVERSITY OF BRITISH COLUMBIA (CANADA); Surgical education, biorobotic surgical instrument development, and clinical procedure development

THORSOS, ERIC I; PhD, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; rough surface scattering, numerical simulation and theory, underwater acoustics

WILSON, DENISE M; PhD, 1995, GEORGIA INSTITUTE OF TECHNOLOGY; Distributed sensing systems design with emphasis on electronics interface.

Research Associate Professor

NELSON, BRIAN A.; PhD, 1987, UNIVERSITY OF WISCONSIN; fusion plasma physics, plasma processing of materials, data acquisition software

Assistant Professor

AMIRPARVIZ, BABAK; PhD, 2001, UNIVERSITY OF MICHIGAN; Nanofabrication, biotechnology, MEMS, organic microsystems, organic electronics, self-assembly

CHOI, JAI JOON; PhD, 1990, UNIVERSITY OF WASHINGTON; adaptive signal processing, neural networks, and fuzzy logic

FOX, DIETER; PhD, 1998, UNIVERSITY OF BONN (GERMANY); artificial intelligence and mobile robotics, probabilistic state estimation, particle filters

GOLDSCHNEIDER, JILL; PhD, 1997, UNIVERSITY OF WASHINGTON; data compression, image processing and clustering.

GUPTA, MAYA R; PhD, 2003, STANFORD UNIVERSITY; statistical classification and estimation, color image processing, information theory

KLAVINS, ERIC; PhD, 1998, UNIVERSITY OF MICHIGAN; Robotics, distributed algorithms, decentralized control and self-assembly

LUBY, JAMES C; PhD, 1984, UNIVERSITY

OF WASHINGTON; signal processing, underwater acoustics, computer simulation, adaptive array processing, tracking

PADMANABHAN, VENKATA N.Z; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Internet performance analysis, wireless networking and mobile computing.

VENKATA, SUBRAHMANYAM S; PhD, 1971, UNIVERSITY OF SOUTH CAROLINA; computer applications to power systems, AI applications, transmission and distribution

Research Assistant Professor

BUSHNELL, LINDA; PhD, 1994, UNIVERSITY OF CALIFORNIA (BERKELEY); Networked control systems, nonlinear control theory, autonomous robotics

Lecturer

PECKOL, JAMES; PhD, 1985, UNIVERSITY OF WASHINGTON; real-time embedded systems, hardware/software co-design, computer architecture, digital fuzzy logic

POTTER, WILLIAM W; MD, 1958, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; electronics.

Industrial Engineering

Professor

ATMAN, CYNTHIA J.; PhD, 1990, CARNEGIE MELLON UNIVERSITY; engineering education issues and developing cognitive models of engineering design

FURNESS, THOMAS A.; PhD, 1981, UNIVERSITY OF SOUTHAMPTON (UK); display systems engineering, human factors, computer graphics, virtual reality

KAPUR, KAILASH C.; PhD, 1969, UNIVERSITY OF CALIFORNIA (BERKELEY); quality/reliability engineering, system design/optimization, total quality/reliability management

NIHAN, NANCY L; PhD, 1970, NORTHWESTERN UNIVERSITY; transportation planning and systems analysis.

STORCH, RICHARD L; PhD, 1978, UNIVERSITY OF WASHINGTON; ship production, large scale assembly and manufacturing systems, statistical quality control, design

ZABINSKY, ZELDA; PhD, 1985, UNIVERSITY OF MICHIGAN; operations research, applications in industrial engineering, optimization with stochastic elements.

Associate Professor

DOUTHWAITE, GEOFFREY K; MSEE, 1963, UNIVERSITY OF WASHINGTON;

rigid body mechanics, software design for engineering economics

DRUI, ALBERT B; MS, 1957, WASHINGTON UNIVERSITY; industrial engineering, human factors

IVERSON, SCOTT CHRISTIAN; PhD, 1974, UNIVERSITY OF COLORADO (BOULDER); health care systems, operations research and systems design and engineering

ROBERTS, NORMAN H; PhD, 1958, UNIVERSITY OF WASHINGTON; reliability and probability theory

Materials Science and Engineering

Professor

ANDERSON, DONALD; BS, 1941, UNIVERSITY OF ILLINOIS; mining and exploration

ARCHBOLD, THOMAS F; PhD, 1961, PURDUE UNIVERSITY; corrosion, thermal diffusion, substructure characterization, fatigue

BORDIA, RAJENDRA KUMAR; PhD, 1986, CORNELL UNIVERSITY; processing and mechanical properties of ceramics, polymer and ceramic composites

FISCHBACH, DAVID B; PhD, 1955, YALE UNIVERSITY; structure and properties of carbons graphite, other non-oxide ceramics, and composite materials

JEN, ALEX K-Y.; PhD, 1984, UNIVERSITY OF PENNSYLVANIA; organic materials/polymer chemistry, functional materials, optical sciences

OHUCHI, FUMIO; PhD, 1981, UNIVERSITY OF FLORIDA; nucleation and growth of thin film materials, surface science, glass, device applications

POLONIS, DOUGLAS H; PhD, 1955, UNIVERSITY OF BRITISH COLUMBIA (CANADA); physical metallurgy, phase transformations in solids, mechanical properties of materials, structure

ROGERS, J. WILLIAM; PhD, 1979, UNIVERSITY OF TEXAS (AUSTIN); surface chemistry and engineering, applications to thin film deposition

SARIKAYA, MEHMET; PhD, 1982, UNIVERSITY OF CALIFORNIA (BERKELEY); Biomimetics, nanotechnology, biomaterials, tissue engineering, dental, magnetics, semiconductors, ce

SCOTT, WILLIAM D; PhD, 1961, UNIVERSITY OF CALIFORNIA (BERKELEY); optical and transmission electron microscopy of high performance ceramics, alumina and electronic materials

WHITTEMORE, OSGOOD J; PhD, 1950, IOWA STATE UNIVERSITY; ceramic processing, refractories, industrial minerals

Associate Professor

MILLER, ALAN D; PhD, 1967, UNIVERSITY OF WASHINGTON; chemical bonding, high temperature equilibria environmental effects on mechanical properties, high

STANG, ROBERT GEORGE; PhD, 1972, STANFORD UNIVERSITY; mechanical behavior, elastic and plastic deformation, and high-temperature creep in materials

ZHANG, MIQIN; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Biomaterials, tissue engineering, BioMEMS, bionanotechnology, surface modification, drug delivery.

Research Associate Professor

FLINN, BRIAN D.; PhD, 1991, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); structure-processing-property relationships in structural materials

Mechanical Engineering

Professor

ALEXANDER, DANIEL; PhD, 1977, WASHINGTON STATE UNIVERSITY; engineering design

BALISE, PETER; MS, 1950, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; systems analysis and control

CHALUPNIK, JAMES; PhD, 1964, UNIVERSITY OF TEXAS (AUSTIN); sound and vibration, wave propagation

CORLETT, RICHARD; PhD, 1963, HARVARD UNIVERSITY; energy systems and combustion

DAY, EMMETT E; PhD, 1962, UNIVERSITY OF CALIFORNIA (BERKELEY); materials, experimental stress analysis

DEPEW, CREIGHTON A; PhD, 1960, UNIVERSITY OF CALIFORNIA (BERKELEY); heat transfer, fluid mechanics

DEVASIA, SANTOSH; PhD, 1993, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); control theory and applications: nanotechnology, distributed systems, and biomedical systems

EMERY, ASHLEY F; PhD, 1961, UNIVERSITY OF CALIFORNIA (BERKELEY); experimental design, heat transfer, HVAC, thermal stress/fracture, bioengineering

FABIEN, BRIAN C.; PhD, 1990, COLUMBIA UNIVERSITY; kinematics, modeling and simulation of physical systems, optimal control

FIREY, JOSEPH C; MME, 1941, UNIVERSITY OF WISCONSIN; combustion, lubrication

GALLE, KURT R; PhD, 1951, PURDUE UNIVERSITY; instrumentation, controls, bioengineering

GANTER, MARK; PhD, 1985, UNIVERSITY OF WISCONSIN; solid modeling,

computer graphics and geometry, kinematics, rapid prototyping, manufacturing design

GARBINI, JOSEPH; PhD, 1977, UNIVERSITY OF WASHINGTON; systems and controls analysis, instrumentation, manufacturing automation

GESSNER, FREDERICK B; PhD, 1964, PURDUE UNIVERSITY; fluid mechanics, turbulence

JORGENSEN, JENS E; DSc, 1969, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; systems analysis, manufacturing, automation and controls, forest engineering

KIPPENHAN, CHARLES J; PhD, 1948, UNIVERSITY OF IOWA; energy conservation in buildings, heating ventilating and air conditioning, heat transfer

KOBAYASHI, ALBERT S; PhD, 1958, ILLINOIS INSTITUTE OF TECHNOLOGY; fracture mechanics

KRAMLICH, JOHN C.; PhD, 1980, WASHINGTON STATE UNIVERSITY; heterogenous combustion, pollutant formation and control from thermal systems, waste remediation

LOVE, WILLIAM J; PhD, 1952, UNIVERSITY OF ILLINOIS; design, mechanics, power systems

MC CORMICK, NORMAN J.; PhD, 1965, UNIVERSITY OF MICHIGAN; radiative transfer, optical oceanography, reliability/risk analysis, mechanical engineering design

MC FERON, DEAN E; PhD, 1956, UNIVERSITY OF ILLINOIS; heat transfer and thermal power processes

MORRISON, JAMES B; MS, 1954, UNIVERSITY OF WASHINGTON; design, dynamics

PRATT, DAVID T; PhD, 1968, UNIVERSITY OF CALIFORNIA (BERKELEY); turbulent combustion, computer simulation

RAMULU, M; PhD, 1982, UNIVERSITY OF WASHINGTON; manufacturing processes, production engineering, applied mechanics, fatigue and fracture mechanics

REINHALL, PER G; PhD, 1982, CALIFORNIA INSTITUTE OF TECHNOLOGY; nonlinear dynamics, vibrations, vibration control, acoustics, biomedical engineering

SHEN, I-YEU (STEVE); PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); linear and nonlinear vibrations, disk and machine dynamics, damping and vibration control

SIDLES, JOHN ARTHUR; PhD, 1983, UNIVERSITY OF WASHINGTON; seeing molecules (i.e., quantum-coherent instrumentation); regenerating cartilage

TAGGART, RAYMOND; PhD, 1956, QUEEN'S UNIVERSITY (UK); mechanical metallurgy

TAYA, MINORU; PhD, 1977, NORTH-WESTERN UNIVERSITY; composite

materials, elasticity and plasticity, impact physics, fracture theory

TUTTLE, MARK E; PhD, 1984, VIRGINIA POLYTECHNIC INST & STATE UNIV; applied solid mechanics, composite materials and structures, adhesion mechanics

WILSON, WILLIAM R.D.; PhD, 1967, QUEEN'S UNIVERSITY OF BELFAST (IRELAND); manufacturing and tribology, particularly metal forming

WOLAK, JAN; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); mechanics of materials, manufacturing processes

Associate Professor

ADEE, BRUCE H; PhD, 1972, UNIVERSITY OF CALIFORNIA (BERKELEY); vessel safety and stability, floating structures, waves, ship resistance, model testing

BERG, MARTIN C.; PhD, 1986, STANFORD UNIVERSITY; digital control system design, control of structurally flexible electromechanical systems

BODOIA, JOHN R; PhD, 1959, CARNEGIE MELLON UNIVERSITY; fluid mechanics, heat transfer, solar energy

CHALK, WILLIAM; MME, 1961, UNIVERSITY OF WASHINGTON; design graphics.

COOPER, JOYCE S.; PhD, 1996, DUKE UNIVERSITY; design for environment and industrial ecology methodologies and models

FORD, PAUL W; MSEng, 1959, UNIVERSITY OF WASHINGTON; manufacturing processes, metal casting

HENRY, ANN M.; PhD, 1995, OHIO STATE UNIVERSITY; polymer composites and manufacturing, polymer optics, heat transfer, design

HOLT, RICHARD; MME, 1957, UNIVERSITY OF WASHINGTON; manufacturing processes, welding

KIELING, WILLIAM C; MME, 1959, UNIVERSITY OF WASHINGTON; design, dynamics, and kinematics

KUMAR, VIPIN; PhD, 1988, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; manufacturing, polymer processing, microcellular plastics, design theory and methodology

NELSON, ALAN C.; PhD, 1980, UNIVERSITY OF CALIFORNIA (BERKELEY); biomedical imaging using image analysis for tissue and tumor studies

SHERRER, ROBERT E; PhD, 1958, UNIVERSITY OF WISCONSIN; solid mechanics

STORTI, DUANE W; PhD, 1983, CORNELL UNIVERSITY; nonlinear dynamics and vibrations, dynamical systems, perturbations and bifurcations

Research Associate Professor

CHING, RANDAL PRESTON; PhD, 1992, UNIVERSITY OF WASHINGTON; orthopaedic biomechanisms related to

injury prevention, injury mechanisms and injury repair

DAHL, PETER H.; PhD, 1989, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; underwater acoustics; sound scattering from the sea surface, bubbles, marine life

SANDWITH, COLIN J; PhD, 1966, OREGON STATE UNIVERSITY; corrosion, material science, design, manufacturing.

Research Assistant Professor

WANG, WEI-CHIH; PhD, 1996, UNIVERSITY OF WASHINGTON; MEMS, fiber optic sensors, biomedical instrumentation, flexible sensors and actuators

Technical Communication

Professor

BEREANO, PHIL; JD, 1965, COLUMBIA UNIVERSITY; MRP, 1971, CORNELL UNIVERSITY; technology assessment, social values, public policy technology: social values, citizen participation
CONEY, MARY B; PhD, 1973, UNIVERSITY OF WASHINGTON; writing style and theories of technical communication, rhetoric

HASELKORN, MARK P; PhD, 1977, UNIVERSITY OF MICHIGAN; real-time information systems, human/machine interaction, the computer in technical communication

RAMEY, JUDITH A; PhD, 1983, UNIVERSITY OF TEXAS (AUSTIN); computer documentation, online documentation,

user interface design and usability testing

WHITE, MYRON; PhD, 1958, UNIVERSITY OF WASHINGTON; technical editing, publications management, bibliography for document design

Associate Professor

WILLIAMS, THOMAS R; PhD, 1988, UNIVERSITY OF WASHINGTON; text and visual information processing, document design, interactive multimedia

Lecturer

KATO, MASASHI; MA, 1980, UNIVERSITY OF WASHINGTON; technology-enhanced instruction, distance learning, research methods, international communication

College of Forest Resources

Professor

- AGEE, JAMES K; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); management of natural systems, forest ecology, fire ecology
- AMMIRATI, JOSEPH F; PhD, 1972, UNIVERSITY OF MICHIGAN; mycology, taxonomy and ecology of fungi
- BARE, B BRUCE; PhD, 1969, PURDUE UNIVERSITY; forest land management and valuation, taxation, finance, management science
- BRADLEY, GORDON A; PhD, 1986, UNIVERSITY OF MICHIGAN; forest land use planning, Conservation area planning and design
- BRIGGS, DAVID G; PhD, 1980, UNIVERSITY OF WASHINGTON; operations research in forest products industries
- BRUBAKER, LINDA B; PhD, 1973, UNIVERSITY OF MICHIGAN; dendrochronology, forest ecology, quaternary paleoecology.
- BRYANT, BENJAMIN S; Doctor of Forestry, 1951, YALE UNIVERSITY; wood utilization technology, wood gluing, plywood and board technology
- COLE, DALE W; PhD, 1963, UNIVERSITY OF WASHINGTON; forest soils, mineral cycling in forest ecosystems
- CONQUEST, LOVEDAY L; PhD, 1975, UNIVERSITY OF WASHINGTON; statistics in forestry, fisheries, and environmental pollution monitoring
- CUNDY, TERRANCE W; PhD, 1983, UTAH STATE UNIVERSITY; hillslope hydrology and watershed management
- DOWDLE, BARNEY; PhD, 1962, YALE UNIVERSITY; development of forest products industries, public forest land management
- DRIVER, CHARLES H; PhD, 1954, LOUISIANA STATE UNIVERSITY; processes of wood decay, forest diseases, range ecology
- EASTIN, IVAN; PhD, 1992, UNIVERSITY OF WASHINGTON; marketing strategies and international trade of forest products
- EDMONDS, ROBERT L; PhD, 1971, UNIVERSITY OF WASHINGTON; forest soil microbiology, biology of forest diseases, aerobiology
- EWING, KERN; PhD, 1982, UNIVERSITY OF WASHINGTON; wetland plant ecology, restoration ecology, ecosystem management
- FRANKLIN, JERRY F.; PhD, 1966, WASHINGTON STATE UNIVERSITY; forest ecosystem analysis, vegetation patterns, tree mortality in natural landscapes
- FRITSCHEN, LEO J; PhD, 1960, IOWA STATE UNIVERSITY; biometeorology, micrometeorology, measurement and instrumentation of the environment
- GARA, ROBERT I; PhD, 1964, OREGON STATE UNIVERSITY; bark beetle, forest insect ecology, forest insect behavior, international forestry
- GUSTAFSON, RICHARD ROY; PhD, 1982, UNIVERSITY OF WASHINGTON; process modeling and optimization, fiber composites
- HANLEY, DONALD P; PhD, 1981, UNIVERSITY OF IDAHO; extension forestry, small-forest management, forestry continuing education
- HARRISON, ROBERT B.; PhD, 1985, AUBURN UNIVERSITY; soil chemistry and fertility, mineral cycling, carbon sequestration, long-term forest productivity
- HATHEWAY, WILLIAM H; PhD, 1956, HARVARD UNIVERSITY; quantitative ecology, physiological ecology, tropical forestry
- HODGSON, KEVIN T; PhD, 1986, UNIVERSITY OF WASHINGTON; surface and colloid science, papermaking chemistry, secondary fiber recycling
- HRUTFIORD, BJORN F; PhD, 1959, UNIVERSITY OF NORTH CAROLINA; wood extractive chemicals, air and water quality in forest products industries
- LEE, ROBERT G; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); natural resource sociology, multiresource management, development/change of forestry institutions
- LIPPKE, BRUCE R; MSEE, 1959, NEW MEXICO STATE UNIVERSITY; MIE, 1966, UNIVERSITY OF CALIFORNIA (BERKELEY); international trade and environmental linkages, investment analysis, economics of forest industry
- MARZLUFF, JOHN M.; PhD, 1987, NORTHERN ARIZONA UNIVERSITY; behavior, ecology, and conservation of birds and mammals
- MCKEAN, WILLIAM T; PhD, 1968, UNIVERSITY OF WASHINGTON; pulp and paper science, chemical engineering
- OLIVER, CHADWICK D; PhD, 1975, YALE UNIVERSITY; silviculture and forest ecology, culture of single- and mixed-species forest stands
- PEREZ-GARCIA, JOHN; MS, 1982, MAYAGUEZ (PUERTO RICO); Doctor of Forestry, 1991, YALE UNIVERSITY; forest economics, analysis of trade policy, global trade modeling, climatic change, carbon cycling
- PETERSON, DAVID L; PhD, 1980, UNIVERSITY OF ILLINOIS; mountain ecology, subalpine forests, global climate change, forest ecology
- PICKFORD, STEWART G; PhD, 1972, UNIVERSITY OF WASHINGTON; forest fire science, wildland fire management
- RICHEY, JEFFREY E; PhD, 1973, UNIVERSITY OF CALIFORNIA (DAVIS); quantitative problems of aquatic ecosystems, primary Amazon River, limnology
- SCHIESS, PETER; PhD, 1975, UNIVERSITY OF WASHINGTON; forest engineering, mechanized harvest and thinning operations, forest road design and construction
- SCHREUDER, GERARD FRITZ; PhD, 1968, YALE UNIVERSITY; statistical analysis in resource economics, international forestry, trade, aerial photos
- SKALSKI, JOHN R.; PhD, 1985, CORNELL UNIVERSITY; population estimation, environmental statistics and sampling, effects assessment
- SPRUGEL, DOUGLAS GEORGE; PhD, 1974, YALE UNIVERSITY; forest ecology, tree ecophysiology, natural disturbance
- STEINEMANN, ANNE; PhD, 1993, STANFORD UNIVERSITY; Water, Drought, Environment, Climate Change, Health, Chemical Exposures, Public Economics, Sustainability
- STETTLER, REINHARD F.; PhD, 1963, UNIVERSITY OF CALIFORNIA (BERKELEY); genetics of forest tree populations, biotechnology, biomass production
- TABER, RICHARD D; PhD, 1951, UNIVERSITY OF CALIFORNIA (BERKELEY); biology and conservation of free-living birds and mammals, wildlife and human culture.
- THOMAS, DAVID P; MA, 1948, UNIVERSITY OF WASHINGTON; economics and technology of utilizing forest crops
- THORUD, DAVID B; PhD, 1964, UNIVERSITY OF MINNESOTA; watershed management, international forest policy and development
- TUKEY, HAROLD B; PhD, 1958, MICHIGAN STATE UNIVERSITY; urban horticulture, horticultural physiology
- VAN VOLKENBURGH, ELIZABETH; PhD, 1980, UNIVERSITY OF WASHINGTON; leaf growth and development, photobiology and electrophysiology
- WAGGENER, THOMAS R; PhD, 1966, UNIVERSITY OF WASHINGTON; policy and economics, regional impact analysis, international trade in forest products
- WEST, STEPHEN D; PhD, 1979, UNIVERSITY OF CALIFORNIA (BERKELEY); vertebrate wildlife ecology and conservation
- WISSMAR, ROBERT C; PhD, 1972, UNIVERSITY OF IDAHO; freshwater ecosystems, fish ecology, and trophic dynamics; river restoration
- WOTT, JOHN A; PhD, 1968, CORNELL UNIVERSITY; public horticulture, horticultural education, public gardens and administration, urban horticulture

Research Professor

- BOOTH, DEREK B; PhD, 1984, UNIVERSITY OF WASHINGTON; Environmental

geology, particularly human influences on hillslopes, runoff, and rivers.
HALPERN, CHARLES; PhD, 1987, OREGON STATE UNIVERSITY; plant community ecology, plant succession, effects of forest management on plant diversity
STRAND, STUART E; PhD, 1982, PENNSYLVANIA STATE UNIVERSITY; forest biotechnology, environmental pollution control

Associate Professor

CHALKER-SCOTT, LINDA; PhD, 1988, OREGON STATE UNIVERSITY; environmental stress physiology of woody plants
GOLD, WARREN G.; PhD, 1988, UTAH STATE UNIVERSITY; BIOLOGY, BOTANY AND PLANT ECOLOGY
GRUE, CHRISTIAN E; PhD, 1977, TEXAS A&M UNIVERSITY; wildlife toxicology, wildlife science
PAUN, DOROTHY A; PhD, 1993, UNIVERSITY OF OREGON; financial performance analyses; international countertrade; business-to-business relationships

REICHARD, SARAH E.; PhD, 1994, UNIVERSITY OF WASHINGTON; conservation biology of plants, biological invasions
ROBERTSON, IAIN M; MLA, 1975, UNIVERSITY OF PENNSYLVANIA; designing with plants, planning and design of botanical gardens/arboreta
RUSTAGI, KRISHNA P; PhD, 1973, YALE UNIVERSITY; operations research and statistical applications in resource management, forest inventory, growth and
RYAN, CLARE; PhD, 1996, UNIVERSITY OF MICHIGAN; natural resource policy and administration, environmental conflict management, water policy
TURNBLOM, ERIC; PhD, 1994, UNIVERSITY OF MINNESOTA; forest growth modeling, quantitative stand dynamics, biometrics and natural resources inventory
VANBLARICOM, GLENN R.; PhD, 1978, UNIVERSITY OF CALIFORNIA (SAN DIEGO); marine wildlife, community ecology

Research Associate Professor

HORNER, RICHARD R.; PhD, 1978, UNIVERSITY OF WASHINGTON; Effects of human activities on water resources in urban areas.
RAEDEKE, KENNETH J; PhD, 1979, UNIVERSITY OF WASHINGTON; wildlife biology and conservation, population dynamics, ungulate ecology, international conservation

Research Assistant Professor

DOTY, SHARON L; PhD, 1995, UNIVERSITY OF WASHINGTON; Molecular biology of pollutant degradation by plants (ie. Phytoremediation)

Lecturer

HENRY, CHARLES L; PhD, 1989, UNIVERSITY OF WASHINGTON; ecological restoration, recycling organic wastes as soil amendments, sustainable resources and infra

The Information School

Professor

BENNE, MAE M; MS, 1955, UNIVERSITY OF ILLINOIS; children's literature, public library services for children
BORNING, ALAN H; PhD, 1979, STANFORD UNIVERSITY; human-computer interaction; constraint-based languages and systems
BORRIELLO, GAETANO; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); invisible and ubiquitous computing, embedded and network systems
BRUCE, HARRY; PhD, 1996, UNIVERSITY OF NEW SOUTH WALES(AUSTRALIA); human factors in information and communication technology
EISENBERG, MICHAEL.; PhD, 1986, SYRACUSE UNIVERSITY; information problem-solving; use of information and information technology; information science
FIDEL, RAYA; PhD, 1982, UNIVERSITY OF MARYLAND; information systems, systems analysis, user interaction, classification research
FULLER, SHERRILYNNE S00; PhD, 1984, UNIVERSITY OF SOUTHERN CALIFORNIA; Analysis, representation and mapping of research findings (data mining.)
GRUDIN, JONATHAN T.; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN DIEGO); computer-supported cooperative work, collaboration technologies, human-computer interaction
HAZELTON, PENELOPE A; JD, 1975, LEWIS AND CLARK COLLEGE; MLL, 1976, UNIVERSITY OF WASHINGTON; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law
HIATT, PETER; PhD, 1963, RUTGERS UNIVERSITY; adult services, special populations, library education, staff development, continuing education
LEVY, DAVID M; PhD, 1979, STANFORD UNIVERSITY; nature of documents and the tools and practices through which they are created and used
SHAW, SPENCER G; BLS, 1941, UNIVERSITY OF WISCONSIN; librarianship

Associate Professor

BROOKS, TERRENCE A; PhD, 1981, UNIVERSITY OF TEXAS (AUSTIN); interest scripting and programming, Web page design, post-alphabetic information designs
CARLYLE, ALLYSON; PhD, 1994, UNIVERSITY OF CALIFORNIA (LOS ANGELES); online catalog use and design, conceptual foundations of descriptive cataloging
FISHER, KAREN E; PhD, 1998, WESTERN ONTARIO UNIVERSITY (CANADA); information behavior
JANES, JOSEPH W.; PhD, 1989, SYRACUSE UNIVERSITY; evolution of models of practice of digital reference
JOHNSON, RONALD A.; MA, 1972, UNIVERSITY OF CHICAGO; MS, 1975, UNIVERSITY OF SOUTHERN CALIFORNIA; information sciences
KAHN, PETER H.; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); Social and Moral Development. Information, Technology, and Nature
METOYER, CHERYL; PhD, 1976, INDIANA UNIVERSITY; Information seeking in ethnic communities and information resources in Native American communities.
MIGNON, EDMOND; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); information retrieval, bibliographic organization, information studies, methods of research
SKELLEY, GRANT T; PhD, 1968, UNIVERSITY OF CALIFORNIA (BERKELEY); bibliography and reference, subject literature, history of the book
SUTTON, STUART A; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); metadata and networked information discovery and retrieval, law and policy of intellectual property

Research Associate Professor

FOX, LOUIS B; MA, 1985, UNIVERSITY OF WASHINGTON; information technology & community development; teaching, learning, & technology; broadband applications

JONES, WILLIAM P.; PhD, 1982, CARNEGIE MELLON UNIVERSITY; personal information management, human factors in information and communication technology

Assistant Professor

MAI, JENS-ERIK; PhD, 2000, UNIVERSITY OF TEXAS (AUSTIN); philosophy, theory and practice of organization and representation of information
NELSON, JEROLD A; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); interpersonal relations in libraries, intellectual freedom.
SAXTON, MATTHEW; PhD, 2000, UNIVERSITY OF CALIFORNIA (LOS ANGELES); evaluation of information services, intermediation, collection management, information competencies
SCHOLL, HANS JOCHEN; PhD, 2002, STATE UNIVERSITY OF NEW YORK (ALBANY); E-Government; Information Management; Organizational Learning; Action Research; System Dynamics
SOPER, MARY E; PhD, 1972, UNIVERSITY OF ILLINOIS; technical services, organization of library materials, cataloging, subject analysis.

Lecturer

BARKER, SCOTT F; MS, 1987, SYRACUSE UNIVERSITY; computer networks, Internet applications, information management
BRUCE, LORRAINE; Graduate Diploma, 1986, CHARLES STEWART UNIVERSITY (AUSTRALIA); information literacy, instructional training strategies for information professionals
HILL, TRENT G.; PhD, 1994, DUKE UNIVERSITY; Knowledge organization; Information behavior; Popular music
HOTCHKISS, MARY A; JD, 1983, GEORGE WASHINGTON UNIVERSITY; LLM, 1985, GEORGE WASHINGTON UNIVERSITY; legal research, writing, and analysis

School of Law

Professor

ALLEN, CRAIG H.; JD, 1989, UNIVERSITY OF WASHINGTON; marine affairs, evidence, environmental regulation

ANDREWS, THOMAS R.; MA, 1973, NORTHWESTERN UNIVERSITY; JD, 1979, UNIVERSITY OF PENNSYLVANIA; professional responsibility in legal practice, community property, decedents' estates, torts, proper

ARONSON, ROBERT H.; JD, 1973, UNIVERSITY OF PENNSYLVANIA; evidence, criminal law, professional responsibility, law and literature

BODANSKY, DANIEL; JD, 1984, YALE UNIVERSITY; international law, international environmental and human rights law, civil procedure

CALANDRILLO, STEVE P.; JD, 1998, HARVARD UNIVERSITY; law & economics, contract law, law & medicine, secured transactions

CLARKE, DONALD C.; MSC, 1983, UNIVERSITY OF LONDON; KING'S COLLEGE (UK); JD, 1987, HARVARD UNIVERSITY; China, modern Chinese law, corporations and business associations, international trade law

EMORY, MEADE; LLM, 1962, BOSTON UNIVERSITY; federal taxation

FLETCHER, ROBERT L.; LLB, 1947, STANFORD UNIVERSITY; property

HAZELTON, PENELOPE A.; JD, 1975, LEWIS AND CLARK COLLEGE; MLL, 1976, UNIVERSITY OF WASHINGTON; law librarianship, legal bibliography, computer-assisted legal research, law, Indian law

HICKS, GREGORY A.; JD, 1978, UNIVERSITY OF TEXAS (AUSTIN); property, environmental law, water law, public lands

HJORTH, ROLAND L.; LLB, 1961, NEW YORK UNIVERSITY; transnational tax, Common Market, federal taxation

HUSTON, JOHN; JD, 1952, UNIVERSITY OF WASHINGTON; LLM, 1955, NEW YORK UNIVERSITY; federal taxation.

JAY, STEWART M.; JD, 1976, HARVARD UNIVERSITY; constitutional law, legal history, legal philosophy, federal courts

JECKER, NANCY A.S.; PhD, 1986, UNIVERSITY OF WASHINGTON; philosophical and ethical aspects of health care delivery and policy

KELLY, LISA A.; JD, 1982, UNIVERSITY OF PENNSYLVANIA; Child Welfare, Juvenile Justice, Education, Poverty, Family, Interdisciplinary work, DV, Race

KUMMERT, RICHARD O.; MBA, 1955, NORTHWESTERN UNIVERSITY; LLB, 1961, STANFORD UNIVERSITY; business planning, corporations, federal tax

KUSZLER, PATRICIA CAROL; MD, 1978, MAYO MEDICAL SCHOOL/GRADUATE SCHOOL; JD, 1991, YALE UNIVERSITY; law and medicine: health-care

finance and regulation, medical malpractice, biotechnology and law

LOFTUS, ELIZABETH F.; PhD, 1970, STANFORD UNIVERSITY; cognition, memory, eye-witness testimony, psychology and law

MARANVILLE, DEBORAH; JD, 1975, HARVARD UNIVERSITY; Civil Clinic, unemployment law, feminist legal theory

MORRIS, ARVAL; JD, 1955, UNIVERSITY OF COLORADO (BOULDER); LLM, 1958, YALE UNIVERSITY; LLD, 1972, COLORADO COLLEGE; constitutional law, jurisprudence

NICOLAS, PETER; MPP, 1992, UNIVERSITY OF MICHIGAN; JD, 1999, HARVARD UNIVERSITY; evidence, federal jurisdiction, choice-of-law, sexual orientation law

OLSWANG, STEVEN G.; PhD, 1977, UNIVERSITY OF WASHINGTON; law and education

PECK, CORNELIUS J.; LLB, 1949, HARVARD UNIVERSITY; administrative law, labor law, torts

RIEKE, LUVERN V.; LLM, 1953, UNIVERSITY OF CHICAGO; LLD, 1959, PACIFIC LUTHERAN UNIVERSITY; contracts, domestic relations.

RODGERS, WILLIAM H.; LLB, 1965, COLUMBIA UNIVERSITY; legislation, environmental law, resource management, property

ROMBAUER, MARJORIE D.; LLB, 1960, UNIVERSITY OF WASHINGTON; creditor and debtor, personal property

SMITH, CHARLES Z.; JD, 1955, UNIVERSITY OF WASHINGTON; evidence, judicial administration

SMITH, FRANK W.; JD, 1962, UNIVERSITY OF RICHMOND; LLM, 1968, HARVARD UNIVERSITY; commercial law, bankruptcy, real property security

STOEBUCK, WILLIAM B.; MA, 1953, INDIANA UNIVERSITY; JD, 1959, UNIVERSITY OF WASHINGTON; SJD, 1973, HARVARD UNIVERSITY; property, land use, legal history

TAKENAKA, TOSHIKO; PhD, 1992, UNIVERSITY OF WASHINGTON; U.S. patent and intellectual property law; international and comparative intellectual property law

VAUGHN, LEA B.; JD, 1978, UNIVERSITY OF MICHIGAN; labor law, alternate dispute resolution, civil procedure

WINN, JANE K.; JD, 1987, HARVARD UNIVERSITY; Electronic commerce, commercial & trade & comparative law: China, European Union; law & development

WOLCHER, LOUIS E.; JD, 1973, HARVARD UNIVERSITY; contracts, critical legal studies, torts, remedies, philosophy of law

Associate Professor

BOXX, KAREN E.; JD, 1983, UNIVERSITY OF WASHINGTON; decedents' estates, community property

DONALDSON, SAMUEL A.; JD, 1993, UNIVERSITY OF ARIZONA; LLM, 1994, UNIVERSITY OF FLORIDA; taxation

GOMULKIEWICZ, ROBERT W.; MA, 1987, UNIVERSITY OF WASHINGTON; JD, 1987, UNIVERSITY OF WASHINGTON; intellectual property, computer law, licensing

KIRTLEY, ALAN; JD, 1972, INDIANA UNIVERSITY; negotiation, mediation, alternative dispute resolution generally, and clinical legal education

RAMASASTRY, ANITA G.; MA, 1989, UNIVERSITY OF SYDNEY (AUSTRALIA); JD, 1992, HARVARD UNIVERSITY; commercial law, legal history, contracts, non-profit organizations

WALSH, WALTER J.; LLM, 1989, YALE UNIVERSITY; torts, legal history, European community, constitutional law

Research Associate Professor

RIVIN, BETH E.; MD, 1982, EAST CAROLINA UNIVERSITY; MPH, 1985, HARVARD UNIVERSITY; Health and Human Rights

Assistant Professor

ANDERSON, HELEN A.; JD, 1984, UNIVERSITY OF WASHINGTON; legal research, writing, and analysis

COVINGTON, WILLIAM EDWARD; JD, 1977, UNIVERSITY OF MICHIGAN; How legislative and regulatory processes impact technology driven organizations

MASTROIANNI, ANNA C.; JD, 1986, UNIVERSITY OF PENNSYLVANIA; MPH, 1997, UNIVERSITY OF WASHINGTON; Law, ethics and policy genetics, reproduction, human subjects research.

MCMURTRIE, JACQUELINE; JD, 1983, UNIVERSITY OF MICHIGAN; criminal law and practice, wrongful convictions, clinical legal education.

O'CONNOR, SEAN M.; MA, 1995, ARIZONA STATE UNIVERSITY; JD, 1998, STANFORD UNIVERSITY; intellectual property; business & securities law; biotechnology law

ROBINSON-DORN, MICHAEL JAY; JD, 1991, CORNELL UNIVERSITY; Environmental/natural resource law, biodiversity, sustainability, transboundary pollution, fisheries

WHITENER, RON; JD, 1994, UNIVERSITY OF WASHINGTON; Federal Indian Law; Indian Treaty Rights; Tribal Law and Indigenous Justice Systems

Lecturer

GOLD, JULIA ANN; JD, 1983, UNIVERSITY OF SOUTH CAROLINA; alternative dispute resolution, mediation

HOTCHKISS, MARY A; JD, 1983, GEORGE WASHINGTON UNIVERSITY; LLM, 1985, GEORGE WASHINGTON UNIVERSITY; legal research, writing, and analysis

MCGINNIS, KATHLEEN M.; JD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); legal research, writing and analysis

School of Medicine

Anesthesiology

Professor

BASHEIN, GERARD; PhD, 1969, CARNEGIE MELLON UNIVERSITY; automation techniques in anesthesia, transesophageal ultrasonic cardiac assesment

DOMINO, KAREN B.; MA, 1974, UNIVERSITY OF NEW MEXICO; MD, 1978, UNIVERSITY OF MICHIGAN; neuroanesthesia.

FREUND, PETER; MA, 1971, BROWN UNIVERSITY; MD, 1975, COLUMBIA UNIVERSITY; temperature regulation, vasomotor control, physiology/biophysics

GEIDUSCHEK, JEREMY M; MD, 1983, VANDERBILT UNIVERSITY; pediatric anesthesiology

HABERKERN, CHARLES M.; MD, 1974, COLUMBIA UNIVERSITY; anesthesiology.

HORNBEIN, THOMAS F; MD, 1956, WASHINGTON UNIVERSITY; physiology, biophysics

LAM, ARTHUR M; MD, 1974, WESTERN ONTARIO UNIVERSITY (CANADA); neuroanesthesia.

LOESER, JOHN D; MD, 1961, NEW YORK UNIVERSITY; pain, neurophysiology.

LYNN, ANNE; MD, 1975, STANFORD UNIVERSITY; pediatric anesthesiology

MACKIE, KENNETH P; MD, 1984, YALE UNIVERSITY; molecular and cell biological studies of cannabinoid receptor signaling

MARTIN, LYNN D; MD, 1982, UNIVERSITY OF WASHINGTON; pediatric anesthesiology

OTTO, CATHERINE M.; BA, 1975, REED COLLEGE; MD, 1979, UNIVERSITY OF WASHINGTON; cardiology

OXORN, DONALD C.; MD, 1978, MCGILL UNIVERSITY (CANADA); trauma and critical care

PEARLMAN, ALAN S; MD, 1970, HARVARD UNIVERSITY; cardiology

READY, L. BRIAN; MD, 1967, UNIVERSITY OF SASKATCHEWAN (CANADA); pain management

ROOKE, G. ALEC; MD, 1980, UNIVERSITY OF WASHINGTON; cardiac anesthesia.

SIVARAJAN, MURALI; MBBS, 1967, JAWAHARLAL INST OF POSTGR MED EDUC & RES; Transesophageal echocardiography, anesthesia education, peer evaluation of teaching

TURK, DENNIS C; PhD, 1978, UNIVERSITY OF WATERLOO (CANADA); pain control/psychology

UNADKAT, JASHVANT D; PhD, 1982, UNIVERSITY OF MANCHESTER (UK); mechanisms of transport of anti-HIV drugs across placenta, CSF-blood barrier, and intestine

ZIMMERMAN, JERRY J.; PhD, 1975, UNIVERSITY OF WISCONSIN; critical-care medicine

Research Professor

BYERS, MARGARET R; PhD, 1969, HARVARD UNIVERSITY; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions

SU, JUDY Y; PhD, 1968, UNIVERSITY OF WASHINGTON; physiological effects of anesthetic drugs

Associate Professor

DEEM, STEVEN A.; MD, 1984, SOUTHERN ILLINOIS UNIVERSITY; critical care

DUNBAR, PETER J.; MBChB, 1978, UNIVERSITY OF ABERDEEN (UK); pain management

EDWARDS, WILLIAM T.; PhD, 1968, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; pain management

EGAN, KELLY J; PhD, 1980, UNIVERSITY OF WASHINGTON; clinical psychology.

FITZGIBBON, DERMOT R.; MBChir, 1983, CORK REGIONAL HOSPITAL; pain management

JARDINE, DAVID; MD, 1980, JOHNS HOPKINS UNIVERSITY; pediatric anesthesiology

KARL, HELEN W.; MD, 1976, UNIVERSITY OF VIRGINIA; pediatric anesthesiology

ORR, ROSEMARY J; MBChir, 1967, QUEEN'S UNIVERSITY OF BELFAST (IRELAND); pediatric anesthesiology

RAPP, SUZANNE E; MD, 1981, UNIVERSITY OF WASHINGTON; pain management

SCHENKMAN, KENNETH A.; MD, 1986, INDIANA UNIVERSITY; pediatric anesthesia

SOUTER, KAREN J.; MBBS, 1985, ST BARTHOLOMEW'S HOSP MED SCHOOL (UK); MS, 1999, UNIVERSITY OF EAST ANGLIA (UK); Education in Anesthesiology

TREGGIARI, MIRIAM; MPH, 1990, UNIVERSITY OF PAVIA (ITALY); MD, 1999, UNIVERSITY OF GENEVA (SWITZERLAND); MPH, 2002, UNIVERSITY OF WASHINGTON; Critical Care Medicine: Acute Lung Injury, Subarachnoid Hemorrhage, sedation, Clinical Epidemiology

VAVILALA, MONICA S.; MD, 1991, UNIVERSITY OF TEXAS (HOUSTON); pediatric pain management

Assistant Professor

AMUNDSEN, LAURIE B.; MD, 1987, UNIVERSITY OF WISCONSIN; resident education

DAVIES, JOANNA M.; MBBS, 1991, LONDON HOSPITAL MEDICAL COLLEGE (UK); Obstetric anesthesia, regional anesthesia and acute pain management

DEMBO, GREGORY; MD, 1978, LENINGRAD UNIVERSITY (RUSSIA); Anesthesia for the Liver transplantation surgery

ERJAVEC, MIKLAVZ K.; MD, 1985, DALHOUSIE UNIVERSITY (CANADA); pain management

KUNDU, ANJANA; MD, 2002, MEDICAL COLLEGE OF WISCONSIN; Pediatric pain management

NATRAJAN, KRISHNA M.; MBBS, 1971, UNIVERSITY OF MADRAS (INDIA); pediatric anesthesia and transesophageal cardiac echocardiography

RUBENS, DANIEL D; MBBS, 1992, UNIVERSITY OF NEW SOUTH WALES(AUSTRALIA); Sudden Infant Death Syndrome, Landscape & Nature Photography, The psychology of conflict resolution

YAGER, ELAINE M.; MD, 1990, UNIVERSITY OF WASHINGTON; pain management

Biochemistry

Professor

BAKER, DAVID; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); protein folding, genomics

BORNSTEIN, PAUL; MD, 1958, NEW YORK UNIVERSITY; structure and function of connective tissue macromolecules, wound healing

CHAMBERLAIN, JEFFREY S; PhD, 1985, UNIVERSITY OF WASHINGTON; neurogenetics, Duchennes muscular dystrophy

COOPER, JONATHAN A.; PhD, 1976, UNIVERSITY OF WARWICK (UK); regulation of cellular metabolism and proliferation by protein phosphorylation

DAGGETT, VALERIE D.; PhD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); molecular modelling studies of peptides and proteins

DALE-CRUNK, BEVERLY A.; PhD, 1968, UNIVERSITY OF MICHIGAN; keratin biochemistry, epithelial differentiation, antimicrobial peptides

DAVIE, EARL WARREN; PhD, 1954, UNIVERSITY OF WASHINGTON; protein synthesis, mechanism of blood clotting, cloning of plasma proteins.

DAVIS, TRISHA NELL; PhD, 1983, YALE UNIVERSITY; control of the cell cycle, chromosome segregation, proteomics

EISENMAN, ROBERT M; PhD, 1971, UNIVERSITY OF CHICAGO; viral

oncology, oncogenes, retrovirus multiplication

EYRE, DAVID R.; PhD, 1969, UNIVERSITY OF LEEDS (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism

FISCHER, EDMOND H.; PhD, 1947, UNIVERSITY OF GENEVA (SWITZERLAND); relationship of protein structure to enzyme activity, hormonal regulation of metabolic processes

GELB, MICHAEL H.; PhD, 1982, YALE UNIVERSITY; mechanistic enzymology, bioorganic and medicinal chemistry

GLOMSET, JOHN A.; MD, 1960, UNIVERSITY OF UPPSALA (SWEDEN); membrane structure and function

HAHN, STEVEN M.; PhD, 1984, BRANDEIS UNIVERSITY; transcription initiation in yeast

HAUSCHKA, STEPHEN D.; PhD, 1966, JOHNS HOPKINS UNIVERSITY; regulation of skeletal muscle differentiation, growth factor-receptor signaling mechanisms

HOL, WILHELMUS G.J.; PhD, 1971, UNIVERSITY OF GRONINGEN (NETHERLANDS); protein crystallography, drug design, vaccine development, and protein engineering

HURLEY, JAMES BRYANT; PhD, 1979, UNIVERSITY OF ILLINOIS; molecular basis of vision

JENSEN, LYLE H.; PhD, 1943, UNIVERSITY OF WASHINGTON; molecular structure, x-ray diffraction

KIMELMAN, DAVID; PhD, 1985, HARVARD UNIVERSITY; molecular biology of early development in the frog, *Xenopus laevis*, and the fish, *Danio rerio*

KLEVIT, RACHEL E.; DPhil, 1981, OXFORD UNIVERSITY (UK); protein structure and function; molecular recognition; protein NMR

KREBS, EDWIN G.; MD, 1943, WASHINGTON UNIVERSITY; intracellular signaling mechanisms involving protein phosphorylation

LOEB, LAWRENCE A.; PhD, 1967, UNIVERSITY OF CALIFORNIA (BERKELEY); DNA replication, cancer and AIDS

MAIZELS, NANCY; PhD, 1974, HARVARD UNIVERSITY; recombination and repair in mammalian cells, especially activated B cells

MORRIS, DAVID R.; PhD, 1964, UNIVERSITY OF ILLINOIS; regulation of growth in eukaryotes and prokaryotes, translational control

PALMITER, RICHARD D.; PhD, 1968, STANFORD UNIVERSITY; regulation of gene expression in transgenic mice

PARSON, WILLIAM W.; PhD, 1965, CASE WESTERN RESERVE UNIVERSITY; bioenergetics, with particular emphasis on photosynthesis, picosecond spectroscopy

PETRA, PHILIP H.; PhD, 1966, TULANE UNIVERSITY; reproductive biochemistry

ROBERTS, JAMES MICHAEL; PhD, 1984, COLUMBIA UNIVERSITY; regulation of DNA replication by cyclin-kinase complexes

ROTH, MARK; PhD, 1988, UNIVERSITY OF COLORADO (BOULDER); nuclear proteins involved in the regulation of gene expression

RUOHOLA-BAKER, HANNELE; PhD, 1989, HELSINKI UNIVERSITY (FINLAND); oogenesis, developmental genetics

RUSSELL, DAVID WILLIAM; PhD, 1988, ROCKEFELLER UNIVERSITY; hematology

SAARI, JOHN C.; PhD, 1970, UNIVERSITY OF WASHINGTON; retinal biochemistry

SHAPIRO, BENNETT M.; MD, 1964, JEFFERSON MEDICAL COLLEGE; molecular basis of reproduction

STENKAMP, RONALD E.; PhD, 1975, UNIVERSITY OF WASHINGTON; crystallography, metalloproteins, protein engineering, blood clotting proteins

STODDARD, BARRY L.; PhD, 1990, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; physical and structural studies of biological macromolecules

STRONG, ROLAND K.; PhD, 1990, HARVARD UNIVERSITY; structural immunology: analysis of the functions of proteins mediating immune responses

WALSH, KENNETH A.; PhD, 1959, UNIVERSITY OF TORONTO (CANADA); structure and functions of proteins, zymogens, and proteases

YOUNG, ELTON; PhD, 1967, CALIFORNIA INSTITUTE OF TECHNOLOGY; regulation of gene activity in the yeast *Saccharomyces cerevisiae*

Research Professor

CHUNG, DOMINIC W.; PhD, 1976, UNIVERSITY OF CALIFORNIA (LOS ANGELES); factor XI deficiency, structure and function of fibrinogen

FUJIKAWA, KAZUO; PhD, 1965, KYOTO UNIVERSITY (JAPAN); studies of blood coagulation and anionic phospholipids at thrombotic sites

Associate Professor

FERRE-D'AMARE, ADRIAN RIU; PhD, 1994, ROCKEFELLER UNIVERSITY; structural biology of RNA, X-ray crystallography, biological catalysis

VERLINDE, CHRISTOPHE; PhD, 1988, CATHOLIC UNIVERSITY OF LEUVEN (BELGIUM); structure-based drug design and protein crystallography

Research Associate Professor

DAUM, GUENTER; PhD, 1989, UNIVERSITY OF KONSTANZ (GERMANY); cellular and molecular biology, tyrosine phosphatase and kinases

MERRITT, ETHAN ALLEN; PhD, 1980, UNIVERSITY OF WISCONSIN; X-ray crystallography and structure-based drug design

MULLER, ERIC D.; PhD, 1981, YALE UNIVERSITY; proteomics and cell biology in yeast

Bioengineering

Professor

AEBERSOLD, RUDOLF HANS; MD, 1984, YALE UNIVERSITY; Protein biochemical investigation of signal transduction pathways.

BAKER, DAVID; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); protein folding, genomics

BASHEIN, GERARD; PhD, 1969, CARNEGIE MELLON UNIVERSITY; automation techniques in anesthesia, transesophageal ultrasonic cardiac assessment

BASSINGTHWAIGHTE, JAMES; PhD, 1964, MAYO MEDICAL SCHOOL/GRADUATE SCHOOL; computer analysis of transport mechanisms in blood and tissues.

CALDWELL, JAMES H.; MD, 1970, UNIVERSITY OF MISSOURI; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function

CONLEY, KEVIN E.; PhD, 1983, UNIVERSITY OF WISCONSIN; muscle metabolism and energetics in vivo

DAGER, STEPHEN R.; MD, 1978, UNIVERSITY OF NEBRASKA; application of functional brain imaging techniques to investigate neuropsychiatric disorders

GIACHELLI, CECILIA; PhD, 1987, UNIVERSITY OF WASHINGTON; adhesion molecules and vascular biology processes

GREEN, PHILIP; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); Mathematical and Computer Methods for Genome Analysis

GUY, ARTHUR W.; PhD, 1966, UNIVERSITY OF WASHINGTON; biological effects and medical applications of electromagnetic fields

HAYNOR, DAVID R.; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); medical image processing and segmentation; image deformation; functional MRI; expression arrays

HLASTALA, MICHAEL P.; PhD, 1969, STATE UNIVERSITY OF NEW YORK (BUFFALO); respiratory physiology, inert gas analysis of respiratory function

HOOD, LEROY E.; PhD, 1968, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution

KALET, IRA J.; PhD, 1968, PRINCETON UNIVERSITY; computer simulation of radiation therapy, artificial intelligence, computer graphics

KATZE, MICHAEL GERALD; PhD, 1980, HAHNEMANN MEDICAL COLLEGE; regulation of viral gene expression at the translational level

LEWELLEN, THOMAS; PhD, 1972, UNIVERSITY OF WASHINGTON; bioengineering, electrical engineering

MANKOFF, DAVID A.; PhD, 1988, UNIVERSITY OF PENNSYLVANIA; HIGH COUNT RATE PET IMAGING

MATSEN, FREDERICK A.; MD, 1968, BAYLOR UNIVERSITY; orthopaedics, bone and joint research, robotics

MURRY, CHARLES E.; PhD, 1989, DUKE UNIVERSITY; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation

NICKERSON, DEBORAH A.; PhD, 1978, UNIVERSITY OF TENNESSEE; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics

POLLACK, GERALD H.; PhD, 1968, UNIVERSITY OF PENNSYLVANIA; muscular contraction

SCHWARTZ, STEPHEN MARK; PhD, 1973, UNIVERSITY OF WASHINGTON; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics

STAYTON, PATRICK S.; PhD, 1989, UNIVERSITY OF ILLINOIS; engineering proteins for biotechnology, biomaterials, and biomedical therapies/diagnostics

TENCER, ALLAN FRED; PhD, 1981, MCGILL UNIVERSITY (CANADA); biomechanics of joints, orthopaedic trauma implants

TRASK, BARBARA J.; PhD, 1985, UNIVERSITY OF LEIDEN (NETHERLANDS); in situ hybridization, analytical cytogenetics, analysis of large-scale DNA polymorphism

VERDUGO, PEDRO; MD, 1965, STATE UNIVERSITY OF CHILE; microrheology, biomechanics, polymer gel physics, laser spectroscopy, cell biology

YAGER, PAUL; PhD, 1980, UNIVERSITY OF OREGON; physical chemistry, applications of biomembranes, biosensors, microfluidics, biomedical diagnostic i

YUAN, CHUN; PhD, 1988, UNIVERSITY OF UTAH; magnetic resonance imaging in medical application

Research Professor

BEACH, KIRK WATSON; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); arterial disease in diabetes, blood flow studies with ultrasonic Doppler

LAI, HENRY C.; PhD, 1978, UNIVERSITY OF WASHINGTON; cellular effects of electromagnetic fields.

Associate Professor

BARRETT, PETER HUGH RUSSEL; PhD, 1989, UNIVERSITY OF ADELAIDE (AUSTRALIA); biomathematics and

modeling methodology, simulation analyses, lipid and lipoprotein metabolism

GROSS, TED S.; PhD, 1993, STATE UNIV OF NEW YORK (STONY BROOK); biomechanics

LINKER, DAVID T.; MD, 1976, STANFORD UNIVERSITY; diagnostic ultrasound in cardiology and cardiovascular pathophysiology

REGNIER, MICHAEL; PhD, 1991, UNIVERSITY OF SOUTHERN CALIFORNIA; Mechanics, kinetics and computational modeling of cardiac/skeletal muscle contraction.

SCHENKMAN, KENNETH A.; MD, 1986, INDIANA UNIVERSITY; pediatric anesthesia

VESSELLE, HUBERT J.; PhD, 1990, CASE WESTERN RESERVE UNIVERSITY; nuclear medicine

VICINI, PAOLO; PhD, 1996, POLYTECHNIC OF MILAN (ITALY); biomathematics and modeling methodology, mathematical models of biological systems

Research Associate Professor

SINGH, NARENDRA PAL; MBBS, 1972, KING GEORGE'S MEDICAL COLLEGE (INDIA); changes in human DNA with age, adverse effects of drugs and environmental chemicals on DNA

Assistant Professor

LI, ZHENG; PhD, 1995, STATE UNIVERSITY OF NEW YORK (BUFFALO); nonlinear kinetic modeling, cardiac metabolism, PET functional imaging

Biological Structure

Professor

CLARK, JOHN I.; PhD, 1974, UNIVERSITY OF WASHINGTON; biophysical and structural properties of cytoplasmic proteins, cell aging, differentiation

DACEY, DENNIS M.; PhD, 1983, UNIVERSITY OF CHICAGO; the neural basis of vision and the organization of primate retina

FARR, ANDREW G.; PhD, 1975, UNIVERSITY OF CHICAGO; cell interactions governing lymphocyte production and function

GEHRIG, JOHN D.; DDS, 1946, UNIVERSITY OF MINNESOTA; MSD, 1951, UNIVERSITY OF MINNESOTA; oral and maxillofacial surgery, biological structure

GRANEY, DANIEL O.; PhD, 1965, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); gross anatomy, electron microscopy, intestinal absorption

HENDRICKSON, ANITA E.; PhD, 1964, UNIVERSITY OF WASHINGTON; neuroanatomy, morphology and development of primate visual system

HERRING, SUSAN W.; PhD, 1971, UNIVERSITY OF CHICAGO; vertebrate functional morphology, relations between muscular function and skull growth

HOL, WILHELMUS G.J.; PhD, 1971, UNIVERSITY OF GRONINGEN (NETHERLANDS); protein crystallography, drug design, vaccine development, and protein engineering

JENSEN, LYLE H.; PhD, 1943, UNIVERSITY OF WASHINGTON; molecular structure, x-ray diffraction

KALET, IRA J.; PhD, 1968, PRINCETON UNIVERSITY; computer simulation of radiation therapy, artificial intelligence, computer graphics

KOEHLER, JAMES K.; PhD, 1961, UNIVERSITY OF CALIFORNIA (BERKELEY); electron microscope, cryobiology, reproductive biology.

PATTON, DOROTHY L.; PhD, 1981, UNIVERSITY OF WASHINGTON; infectious disease

PRESS, OLIVER W.; PhD, 1977, UNIVERSITY OF WASHINGTON; treatment of hematologic malignancies with monoclonal antibody immunoconjugates

RAIBLE, DAVID W.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; zebrafish neural development

REH, THOMAS A.; PhD, 1981, UNIVERSITY OF WISCONSIN; regeneration and development of central nervous system

ROSSE, CORNELIUS; MD, 1964, UNIVERSITY OF BRISTOL (UK); DSc, 1983, UNIVERSITY OF BRISTOL (UK); knowledge representation in anatomy

SAGE, E HELENE; PhD, 1977, UNIVERSITY OF UTAH; molecular and cell biology

SHERK, HELEN; PhD, 1978, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; neural mechanisms underlying vision, especially visual guidance during locomotion

STENKAMP, RONALD E.; PhD, 1975, UNIVERSITY OF WASHINGTON; crystallography, metalloproteins, protein engineering, blood clotting proteins

Research Professor

BASKIN, DENIS G.; PhD, 1969, UNIVERSITY OF CALIFORNIA (BERKELEY); neuroendocrinology; obesity; CNS regulation of body weight; histochemistry; expression of receptors

BRINKLEY III, JAMES F.; PhD, 1984, STANFORD UNIVERSITY; computer applications in medicine and biology

BYERS, MARGARET R.; PhD, 1969, HARVARD UNIVERSITY; sensory neurobiology, neurocytochemistry, and neuropathologic reactions; neuroimmune interactions

COOK, DANIEL L.; PhD, 1980, UNIVERSITY OF WASHINGTON; Functional bioinformatics; pancreatic b-cell electrical activity and insulin release.

REUVENI, ZIPORA; PhD, 1979, UNIVERSITY OF WINDSOR (CANADA);

myogenesis during growth development and regeneration of skeletal muscle

Associate Professor

CUNNINGHAM, MICHAEL L.; PhD, 1996, UNIVERSITY OF WASHINGTON; molecular, development, craniofacial, malformation, human, mouse, cranio-synostosis, birth defects
GADDUM-ROSSE, PENELOPE; PhD, 1965, UNIVERSITY OF LIVERPOOL (UK); reproductive biology.
HARRIS, ROGER M.; PhD, 1975, UNIVERSITY OF WASHINGTON; neuro-anatomical recovery from spinal cord injury
NAMEROFF, MARK A.; PhD, 1966, UNIVERSITY OF PENNSYLVANIA; cell differentiation.
PROTHERO, JOHN W.; PhD, 1960, WESTERN ONTARIO UNIVERSITY (CANADA); model building, morphogenesis, cell kinetics, scaling
ROBINSON, FARREL R.; PhD, 1982, BROWN UNIVERSITY; study of the cerebellum via monkey eye movements
ROELINK, HENK; PhD, 1991, UNIVERSITY OF AMSTERDAM (NETHERLANDS); role of signaling molecules in mediating neural tissue differentiation during vertebrate development
VERLINDE, CHRISTOPHE; PhD, 1988, CATHOLIC UNIVERSITY OF LEUVEN (BELGIUM); structure-based drug design and protein crystallography
XU, WENQING; PhD, 1995, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; structural studies of proteins involved in cancer, immune dysfunction and neuronal diseases

Research Associate Professor

MERRITT, ETHAN ALLEN; PhD, 1980, UNIVERSITY OF WISCONSIN; X-ray crystallography and structure-based drug design

Assistant Professor

BRODERSON, STEVAN H.; PhD, 1967, STATE UNIVERSITY OF NEW YORK (BUFFALO); lipid histochemistry.

Lecturer

MULLIGAN, KATHLEEN A.; PhD, 1985, UNIVERSITY OF NEW SOUTH WALES(AUSTRALIA); neurobiology, gross anatomy, teaching innovations, technical communication

Comparative Medicine

Professor

DENNIS, MELVIN B.; DVM, 1961, WASHINGTON STATE UNIVERSITY; comparative medicine, including animal models and experimental surgery

DI GIACOMO, RONALD F.; DVM, 1965, UNIVERSITY OF PENNSYLVANIA; MPH, 1974, UNIVERSITY OF WASHINGTON; comparative epidemiology and zoonoses

JOHNSEN, DENNIS O.; DVM, 1961, UNIVERSITY OF CALIFORNIA (DAVIS); MS, 1965, OHIO STATE UNIVERSITY; comparative medicine including nonhuman primate medicine, international health

LADIGES, WARREN C.; DVM, 1971, WASHINGTON STATE UNIVERSITY; immunobiology of aging, transgenic mouse models of aging, DNA repair genes and age-associated cancer
LIGGITT, H DENNY; PhD, 1979, COLORADO STATE UNIVERSITY; using in vivo models to evaluate novel approaches for gene delivery, transgenic models

PRICE, LILLIAN M.; PhD, 1983, UNIVERSITY OF PENNSYLVANIA; t-cell development in the thymus, immunotoxicology, thymus development, retinoic acid embryopathy

RAUSCH, ROBERT L.; PhD, 1949, UNIVERSITY OF WISCONSIN; parasitology, helminthic zoonoses

VAN HOOSIER, GERALD; DVM, 1957, TEXAS A&M UNIVERSITY; laboratory animal medicine with emphasis on effects of intercurrent infection on mouse phenotypes

WOLF, NORMAN S.; PhD, 1960, NORTH-WESTERN UNIVERSITY; hematopoietic stem cell dynamics and transplantation in radiation biology

Associate Professor

BRABB, THEA L.; PhD, 1999, UNIVERSITY OF WASHINGTON; using in vivo models to understand immune tolerance and autoimmunity

GROSSMANN, ANGELIKA; PhD, 1982, FREIE UNIVERSITÄT OF BERLIN (GERMANY); immunosenescence in humans and mice; immunotoxicology; transmembrane signaling in T-lymphocytes

IRITANI, BRIAN M.; PhD, 1997, UNIVERSITY OF WASHINGTON; developmental immunology, cell signaling, oncogene function

PEKOW, CYNTHIA A.; DVM, 1984, UNIVERSITY OF ILLINOIS; comparative medicine, instruction of research staff and technicians in animal care and use

WEIGLER, BENJAMIN J.; PhD, 1991, UNIVERSITY OF CALIFORNIA (DAVIS); infectious disease epidemiology in laboratory animal medicine and management

Research Associate Professor

WARE, CAROL B.; PhD, 1986, UNIVERSITY COLLEGE (IRELAND); Multi-systemic LIF receptor function in developing and adult mice.

Family Medicine

Professor

BALDWIN, LAURA M.; MD, 1980, UNIVERSITY OF SOUTHERN CALIFORNIA; MPH, 1986, UNIVERSITY OF WASHINGTON; family medicine.

BERG, ALFRED O.; MD, 1974, WASHINGTON UNIVERSITY; MPH, 1979, UNIVERSITY OF WASHINGTON; family medicine

CARLINE, JAN D.; PhD, 1979, UNIVERSITY OF WASHINGTON; assessment of physician performance, evaluation of medical education programs

CHERKIN, DANIEL C.; PhD, 1978, UNIVERSITY OF WASHINGTON; outcomes of care for back pain and other common problems

COOMBS, JOHN B.; MD, 1972, CORNELL UNIVERSITY; Health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

CRITTENDEN, ROBERT A.; MD, 1976, UNIVERSITY OF WASHINGTON; MPH, 1987, UNIVERSITY OF WASHINGTON; health plans/policies

ELLSWORTH, ALLAN J.; PharmD, 1977, PHILADELPHIA COLL OF PHARMACY & SCIENCE; primary care, family medicine

GEYMAN, JOHN P.; MD, 1960, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); family medicine.

GLOYD, STEPHEN S.; MD, 1973, UNIVERSITY OF CHICAGO; MPH, 1983, HARVARD UNIVERSITY; political economy, epidemiology, and primary health care in developing countries
GORDON, MICHAEL J.; PhD, 1973, MICHIGAN STATE UNIVERSITY; family medicine

HART, LAWRENCE G.; PhD, 1985, UNIVERSITY OF WASHINGTON; rural health policy, medical geography

KATON, WAYNE J.; MD, 1976, UNIVERSITY OF OREGON; depression, panic disorder, somatization, adherence

LOSH, DAVID PAUL; MD, 1974, UNIVERSITY OF KANSAS; family medicine
NORRIS, THOMAS E.; MD, 1973, UNIVERSITY OF TEXAS

(GALVESTON); Clinical applications, health policy and health workforce needs.

ROSENBLATT, ROGER A.; MPH, 1971, HARVARD UNIVERSITY; MD, 1971, HARVARD UNIVERSITY; research into the organization and delivery of health services, rural health policy

SCHNEEWEISS, RONALD; MBChB, 1964, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); family medicine.

STEVENS, NANCY G.; MD, 1979, UNIVERSITY OF WASHINGTON; MPH, 1982, UNIVERSITY OF WASHINGTON; family medicine

SUGARMAN, JONATHAN R.; MD, 1981, ALBERT EINSTEIN COLLEGE OF

MEDICINE; MPH, 1990, UNIVERSITY OF WASHINGTON; American Indian and Alaska Native health; Health Care Quality Assessment and Improvement
WALKER, EDWARD A.; MD, 1983, UNIVERSITY OF WASHINGTON; consultation-liaison psychiatry, medically unexplained physical symptoms

Associate Professor

CHURCH, LILI LUCILLE; MD, 1985, UNIVERSITY OF IOWA; family medicine
DOBIE, SHARON A.; MCP, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); MD, 1979, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); family medicine.
DOESCHER, MARK; MD, 1989, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); family medicine, medically vulnerable populations, primary care research
ELLSBURY, KATHLEEN E.; MD, 1977, JOHNS HOPKINS UNIVERSITY; MPH, 1982, UNIVERSITY OF MISSOURI; family medicine.
FARBER, STUART J.; MD, 1974, UNIVERSITY OF WASHINGTON; patient centered communication, palliative/end-of-life care
GOLDBAUM, GARY M.; MD, 1978, UNIVERSITY OF COLORADO (DENVER); MPH, 1989, UNIVERSITY OF WASHINGTON; preventive medicine, chronic diseases prevention, injury prevention
GREER, H THOMAS; MD, 1974, UNIVERSITY OF MISSISSIPPI; MPH, 1979, UNIVERSITY OF WASHINGTON; family medicine.
HUNTINGTON, JANE; MD, 1994, UNIVERSITY OF WASHINGTON; family medicine
KIM, SARA; PhD, 1999, UNIVERSITY OF WASHINGTON; educational technology
LEVERSEE, JOHN H.; MD, 1952, UNIVERSITY OF MINNESOTA; family medicine
LYNGE, DANA C.; MD, 1985, MCGILL UNIVERSITY (CANADA); general surgery
NEIGHBOR, WILLIAM E.; MD, 1979, UNIVERSITY OF WASHINGTON; family medicine and preventive cardiology.
O'KANE, JOHN; MD, 1993, UNIVERSITY OF VERMONT; family medicine, sports medicine, team care
OLIVER, LYNN M.; MD, 1983, UNIVERSITY OF WASHINGTON; family medicine.
PINSKY, LINDA E.; MD, 1989, UNIVERSITY OF WASHINGTON; general internal medicine
ROBINS, LYNNE S.; PhD, 1990, UNIVERSITY OF MICHIGAN; cultural competence, physician-patient communication, qualitative research assessment
SAVER, BARRY G.; MA, 1978, HARVARD UNIVERSITY; MD, 1983, COLUMBIA UNIVERSITY; MPH, 1991, UNIVERSITY OF WASHINGTON; family medicine

TAYLOR, THOMAS R.; PhD, 1971, UNIVERSITY OF GLASGOW (UK); family medicine.

WRIGHT, GEORGE; PhD, 1977, UNIVERSITY OF MICHIGAN; health economics emphasizing primary care, physician competition, rural health

Assistant Professor

OSBORN, JUSTIN; MD, 1989, UNIVERSITY OF VIRGINIA; family medicine
SPIELBERG, FREYA; MD, 1992, CORNELL UNIVERSITY; MPH, 1997, UNIVERSITY OF WASHINGTON; family medicine, HIV/STD prevention, behavior change

Lecturer

LANDEL, GRACE P.; MED, 1999, UNIVERSITY OF WASHINGTON; physician assistant education
MAUKSCH, LARRY B.; MED, 1982, UNIVERSITY OF WASHINGTON; physician/patient communication, underprivileged populations, mental health/primary care integration
SCOTT, TERRY B.; PAsst, 1993, UNIVERSITY OF WASHINGTON; physician assistant education, underserved and minority population health care

Genome Sciences

Professor

BAKER, DAVID; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); protein folding, genomics
BERG, CELESTE A.; PhD, 1986, YALE UNIVERSITY; Drosophila developmental genetics: Cell communication and cell migration during oogenesis. Patternin
BLAU, CARL A.; MD, 1986, OHIO STATE UNIVERSITY; hematology
BRAUN, ROBERT ELMER; PhD, 1985, TUFTS UNIVERSITY; mammalian genetics, germ cell development and reproduction
BREWER, BONITA J.; PhD, 1979, UNIVERSITY OF WASHINGTON; replication of chromosomes, plasmids, and mitochondrial DNA in yeast
BYERS, BRECK E.; PhD, 1967, HARVARD UNIVERSITY; cell biology: mitosis and meiosis, mechanisms of nuclear division and crossing-over in yeast
BYERS, PETER H.; MD, 1969, CASE WESTERN RESERVE UNIVERSITY; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics
EISEN, HARVEY; PhD, 1967, UNIVERSITY OF TORONTO (CANADA); host-parasite interactions, generation of genetic diversity
FELSENSTEIN, JOSEPH; PhD, 1968, UNIVERSITY OF CHICAGO; estimation of evolutionary trees, models of long-term evolutionary processes, and theoretical population genetics
GALLANT, JONATHAN A.; PhD, 1961, JOHNS HOPKINS UNIVERSITY; molecular genetics, control mechanisms in bacteria, accuracy of translation
GARTLER, STANLEY M.; PhD, 1952, UNIVERSITY OF CALIFORNIA (BERKELEY); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation
GOVERMAN, JOAN M.; PhD, 1981, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity
GREEN, PHILIP; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); Mathematical and Computer Methods for Genome Analysis
HALL, BENJAMIN D.; PhD, 1959, HARVARD UNIVERSITY; the evolution of nuclear genes in plants and fungi
HARTWELL, LELAND H.; PhD, 1964, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; genetic analysis of chromosome transmission and of the control of division by hormones in yeast
HENIKOFF, STEVEN; PhD, 1977, HARVARD UNIVERSITY; chromosome organization, epigenetic effects, analysis of protein sequence information
HOOD, LEROY E.; PhD, 1968, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution
HORWITZ, MARSHALL S.; PhD, 1988, UNIVERSITY OF WASHINGTON; inherited white blood cell disorders, including leukemia
JARVIK, GAIL P.; PhD, 1986, UNIVERSITY OF MICHIGAN; quantitative genetics and genetic epidemiology, focusing on common diseases
KING, MARY-CLAIRE; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic analysis of complex human phenotypes, human diversity and evolution
MANOIL, COLIN C.; PhD, 1979, STANFORD UNIVERSITY; molecular genetics, protein localization in bacteria
MONNAT, RAYMOND J.; MD, 1976, UNIVERSITY OF CHICAGO; somatic mutation, somatic cell molecular genetics, human genetic disease
MOTULSKY, ARNO G.; MD, 1947, UNIVERSITY OF ILLINOIS; medical genetics
NICKERSON, DEBORAH A.; PhD, 1978, UNIVERSITY OF TENNESSEE; automating the analysis of single nucleotide polymorphisms, human genetics, DNA diagnostics
OLSON, MAYNARD V.; PhD, 1970, STANFORD UNIVERSITY; Methods and applications of large-scale DNA analysis
OSTRANDER, ELAINE A.; PhD, 1987, OREGON HEALTH SCIENCES

UNIVERSITY; Genetic Mapping of Simple and Complex Traits
 PALMITER, RICHARD D; PhD, 1968, STANFORD UNIVERSITY; regulation of gene expression in transgenic mice
 RAIBLE, DAVID W.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; zebrafish neural development
 RASKIND, WENDY H; PhD, 1977, UNIVERSITY OF WASHINGTON; medical genetics.
 REID, BRIAN J; PhD, 1975, UNIVERSITY OF WASHINGTON; genetic and cell cycle abnormalities in neoplastic progression in Barrett's esophagus
 RUOHOLA-BAKER, HANNELE; PhD, 1989, HELSINKI UNIVERSITY (FINLAND); oogenesis, developmental genetics
 SIBLEY, CAROL HOPKINS; PhD, 1974, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); molecular parasitology and drug resistance
 SMITH, GERALD R; PhD, 1970, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; molecular biology of genetic recombination and regulation of gene expression.
 STADLER, DAVID R; PhD, 1952, PRINCETON UNIVERSITY; mutation and genetic repair in *Neurospora*.
 STAMATOYANNOPOULOS, G; MD, 1958, UNIVERSITY OF ATHENS (GREECE); DrMedSci, 1960, UNIVERSITY OF ATHENS (GREECE); medical genetics.
 THOMAS, JAMES H; PhD, 1985, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; genetics of development and the nervous system in nematodes
 TRASK, BARBARA J; PhD, 1985, UNIVERSITY OF LEIDEN (NETHERLANDS); in situ hybridization, analytical cytogenetics, analysis of large-scale DNA polymorphism
 WATERSTON, ROBERT H; PhD, 1972, PRINCETON UNIVERSITY; DNA sequencing and comparative gene analysis
 YOUNG, ELTON; PhD, 1967, CALIFORNIA INSTITUTE OF TECHNOLOGY; regulation of gene activity in the yeast *Saccharomyces cerevisiae*

Research Professor

DEEB, SAMIR S.; PhD, 1964, UNIVERSITY OF ILLINOIS; genetic factors predisposing to hyperlipidemia and coronary artery disease
 FURLONG, CLEMENT E.; PhD, 1968, UNIVERSITY OF CALIFORNIA (DAVIS); human biochemical genetics in biochemistry of membrane transport systems
 WIJSMAN, ELLEN M; PhD, 1981, UNIVERSITY OF WISCONSIN; human quantitative and population genetics

Associate Professor

BREEDEN, LINDA; PhD, 1981, UNIVERSITY OF COLORADO (BOULDER); Start control in *S. cerevisiae*

NELSON, PETER S.; MD, 1986, UNIVERSITY OF KANSAS; the study of human carcinogenesis using tools of genomics and bioinformatics
 NOBLE, WILLIAM S; PhD, 1998, UNIVERSITY OF CALIFORNIA (SAN DIEGO); the development of machine learning techniques for application to problems in molecular biology
 PALLANCK, LEO J.; PhD, 1992, ALBERT EINSTEIN COLLEGE OF MEDICINE; Genetic and Molecular analysis of symptomatic transmission in *Drosophila melanogaster*
 SORIANO, PHILIPPE; PhD, 1978, UNIVERSITY OF PARIS (FRANCE); Mouse Developmental Genetics
 STEPHENS, MATTHEW; PhD, 1997, OXFORD UNIVERSITY (UK); Bayesian inference, classification and clustering, Markov chain Monte Carlo, statistical genetics

Assistant Professor

EDGAR, BRUCE A; PhD, 1987, UNIVERSITY OF WASHINGTON; Cell cycle control during development of *Drosophila*
 MACCOSS, MICHAEL; PhD, 2001, UNIVERSITY OF VERMONT; proteomics, mass spectrometry, and protein turnover kinetics
 STOREY, JOHN D; PhD, 2002, STANFORD UNIVERSITY; statistical genomics, computational biology, applied statistics
 SWANSON, WILLIE J; PhD, 1998, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Function & molecular evolution of proteins with emphasis on reproduction

Lecturer

PAUL, ANNE S; MA, 1993, UNIVERSITY OF WASHINGTON; molecular biology, Science Education
 SCHIVELL, AMANDA E; PhD, 2000, UNIVERSITY OF WASHINGTON; Teaching biology and genetics to undergraduates

Immunology

Professor

ADEREM, ALAN A.; PhD, 1979, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); signal transduction and the cytoskeleton
 BEVAN, MICHAEL J.; PhD, 1972, NATIONAL INST FOR MEDICAL RESEARCH (UK); T lymphocyte development and specificity
 CLARK, EDWARD A; PhD, 1977, UNIVERSITY OF CALIFORNIA (LOS ANGELES); lymphocyte surface molecules, lymphocyte activation and cell communication

CONCANNON, PATRICK J.; PhD, 1984, UNIVERSITY OF CALIFORNIA (LOS ANGELES); development of the human T cell receptor repertoire, genetics of diabetes and ataxia-telangiectasia
 FARR, ANDREW G; PhD, 1975, UNIVERSITY OF CHICAGO; cell interactions governing lymphocyte production and function
 FINK, PAMELA J.; PhD, 1981, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; T cell differentiation, tolerance induction, molecular and cellular immunology
 GOVERMAN, JOAN M; PhD, 1981, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immune recognition and tolerance, autoimmunity, T cell development, activation, antibody diversity
 GREENBERG, PHILIP D; MD, 1971, ST UNIV OF NEW YORK (DOWNSTATE MED CTR); molecular, cellular, viral, and tumor immunology
 HOOD, LEROY E.; PhD, 1968, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular immunology, large-scale DNA mapping and sequencing, molecular evolution
 LERNMARK, AKE; PhD, 1971, UNIVERSITY OF UMEA; immunogenetics of organ-specific autoimmunity with emphasis on insulin-dependent diabetes
 MAIZELS, NANCY; PhD, 1974, HARVARD UNIVERSITY; recombination and repair in mammalian cells, especially activated B cells
 NEPOM, GERALD T; PhD, 1977, UNIVERSITY OF WASHINGTON; immunogenetics, immunoregulation, neuroimmunology
 PERLMUTTER, ROGER M.; PhD, 1979, WASHINGTON UNIVERSITY; molecular immunology and signal transduction in hematopoietic cells
 RUDENSKY, ALEXANDER Y.; PhD, 1986, GABRICHEVSKY INSTITUTE FOR EPI & MICRO; antigen processing and presentation, T-cell recognition, T cell development
 STRONG, ROLAND K; PhD, 1990, HARVARD UNIVERSITY; structural immunology: analysis of the functions of proteins mediating immune responses
 WILSON, CHRISTOPHER B; MD, 1972, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immunology, infectious diseases

Associate Professor

NELSON, BRADLEY H.; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); molecular regulation of T lymphocyte proliferation by the interleukin-2 receptor
 ZIEGLER, STEVEN F.; PhD, 1984, UNIVERSITY OF CALIFORNIA (LOS ANGELES); genetic and molecular analysis of immune system function

Assistant Professor

BIX, MARK; PhD, 1993, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; regulation of cytokine gene expression during effector T cell development
KAJA, MURALI KRISHNA; PhD, 1995, INDIAN INSTITUTE OF TECHNOLOGY (INDIA); generation and maintenance of immune memory
LATCHMAN, YVETTE; PhD, 1996, UNIVERSITY COLLEGE, LONDON (UK); T cell activation and costimulation
WEINMANN, AMY S; PhD, 2000, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Mechanisms of transcriptional regulation in the immune system.

Research Assistant Professor

GAVIN, MARC A.; PhD, 1995, UNIVERSITY OF WASHINGTON; The molecular mechanisms that govern regulatory T cell homeostasis

Laboratory Medicine

Professor

ASHLEY MORROW, RHODA; PhD, 1977, UNIVERSITY OF CALIFORNIA (DAVIS); pathogenesis of viral infections, immune response to herpes, rapid diagnosis
BAUER, LARRY; PharmD, 1980, UNIVERSITY OF KENTUCKY; clinical pharmacokinetics and drug metabolism, drug interactions
CHANDLER, WAYNE L.; MD, 1982, ST LOUIS UNIVERSITY; clinical chemistry, clinical coagulation, hematology
CHATRIAN, GIAN E.; MD, 1951, UNIVERSITY OF NAPLES (ITALY); electroencephalography and clinical neurophysiology
CLARRIDGE, JILL E.; PhD, 1973, PURDUE UNIVERSITY; microbial pathogens; microbial taxonomy
COOMBS, ROBERT W.; PhD, 1977, DALHOUSIE UNIVERSITY (CANADA); diagnosis and pathogenesis of HIV infection
COREY, LAWRENCE; MD, 1971, UNIVERSITY OF MICHIGAN; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus
COYLE, MARIE B.; PhD, 1965, KANSAS STATE UNIVERSITY; DNA probes and GLC for rapid identification of mycobacteria and corynebacteria
DETTER, JAMES C.; MD, 1962, UNIVERSITY OF KANSAS; laboratory diagnosis of genetic disorders, red-cell disorders and laboratory instrumentation
FRENKEL, LISA M.; MD, 1987, UNIVERSITY OF KANSAS; infectious diseases
GILLILAND, BRUCE C.; MD, 1960, NORTHWESTERN UNIVERSITY; hematology

KAPLAN, ALEX; PhD, 1936, UNIVERSITY OF CALIFORNIA (BERKELEY); clinical chemistry
KENNY, MARGARET; PhD, 1968, UNIVERSITY OF ILLINOIS; clinical chemistry, new technologies for in vivo clinical biochemical analysis
LABBE, ROBERT F.; PhD, 1951, OREGON STATE UNIVERSITY; porphyrin disorders, nutritional biochemistry
MCELRATH, MARGARET JULIANA; PhD, 1978, MEDICAL UNIVERSITY OF SOUTH CAROLINA; infectious diseases
MULLINS, JAMES I.; PhD, 1978, UNIVERSITY OF MINNESOTA; retroviruses and AIDS, molecular virology
PLORDE, JAMES J.; MD, 1959, UNIVERSITY OF MINNESOTA; infectious diseases, antibiotic-resistant nosocomial infections
RAGHU, GANESH; MD, 1974, UNIVERSITY OF MYSORE (INDIA); respiratory disease.
RAINEY, PETRIE M.; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); clinical chemistry, medical toxicology, therapeutic drug monitoring, pharmacology of antimicrobials
RAISYS, VIDMANTAS A.; PhD, 1969, STATE UNIVERSITY OF NEW YORK (BUFFALO); clinical toxicology, therapeutic drug monitoring
RUTLEDGE, JOE C.; MD, 1976, VANDERBILT UNIVERSITY; genetic disease pathology, human embryology, mouse mutagenesis, pediatric chemistry/hematology
SCHMER, GOTTFRIED; MD, 1956, UNIVERSITY OF VIENNA (AUSTRIA); synthesis of artificial organs, molecular engineering of antitumor enzymes
TAIT, JONATHAN F.; PhD, 1983, WASHINGTON UNIVERSITY; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders
WENER, MARK H.; MD, 1974, WASHINGTON UNIVERSITY; diagnostic immunology, immune complex diseases

Research Professor

STEPHENS, KAREN G.; PhD, 1982, INDIANA UNIVERSITY; molecular genetics of human disease; human gene mapping
ZEH, JUDITH; PhD, 1979, UNIVERSITY OF WASHINGTON; estimation of population size and dynamics; robust methods, computing in infectious disease research

Associate Professor

ASTION, MICHAEL L.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; neural networks, multi media computer-aided tutorials, immunology
BANKSON, DANIEL D.; PhD, 1985, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; nutritional status of antioxidants and fat-soluble vitamins.

CHOU, DAVID; MD, 1974, UNIVERSITY OF PITTSBURGH; MS, 1979, UNIVERSITY OF MINNESOTA; medical informatics, instrument automation, clinical chemistry
CLAYSON, KATHLEEN J.; MS, 1968, UNIVERSITY OF MINNESOTA; enzymology in clinical chemistry
COOKSON, BRAD T.; PhD, 1991, WASHINGTON UNIVERSITY; cellular immune response to intracellular bacteria; microbial pathogenesis; clinical microbiology
DELANEY, COLLENE J.; PhD, 1972, UNIVERSITY OF ILLINOIS; clinical chemistry, the study of diabetes and alcoholism
FINE, JAMES; MD, 1972, UNIVERSITY OF MINNESOTA; MS, 1977, UNIVERSITY OF MINNESOTA; enzymology, medical informatics
FLIGNER, CORINNE L.; MD, 1976, UNIVERSITY OF NEW MEXICO; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology
GRETCH, DAVID R.; PhD, 1990, UNIVERSITY OF IOWA; research and diagnostics related to viral hepatitis
HACKMAN, ROBERT C.; MD, 1971, STANFORD UNIVERSITY; infectious and pulmonary complications in immunocompromised patients
KOELLE, DAVID; MD, 1985, UNIVERSITY OF WASHINGTON; allergy and infectious diseases
LAMPE, MARY F.; PhD, 1984, UNIVERSITY OF NORTH CAROLINA; medical technology education, molecular analysis of Chlamydia trachomatis
OPHEIM, KENT E.; PhD, 1972, CORNELL UNIVERSITY; molecular cytogenetics, pediatric clinical chemistry, drug assay development
SABATH, DANIEL E.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; regulation of gene expression in hematopoietic cells
SCHILLER, HARVEY S.; MD, 1966, WASHINGTON UNIVERSITY; clinical chemistry, hematology, interpretation of laboratory data
WALD, ANNA; MD, 1985, MT SINAI SCHOOL OF MEDICINE; MPH, 1994, UNIVERSITY OF WASHINGTON; the epidemiology, natural history and therapeutics of HSV and other herpesviruses infections
WOOD, BRENT L.; PhD, 1988, LOMA LINDA UNIVERSITY; Hematopathology, leukemia, lymphoma, flow cytometry, cell sorting.

Research Associate Professor

LIBBY, STEPHEN JAMES; PhD, 1987, IOWA STATE UNIVERSITY; Salmonella molecular pathogenesis and resistance to oxidative stresses

Assistant Professor

BEHRENS, JOYCE A.; MS, 1971, UNIVERSITY OF MINNESOTA; clinical hematology and clinical coagulation methodologies
CONE, RICHARD W.; PhD, 1980, STANFORD UNIVERSITY; viral nucleic acid detection for diagnosis, viral tumor genesis
LE CRONE, CAROL N.; MS, 1966, COLORADO STATE UNIVERSITY; hematology, hemoglobinopathies
MC GONAGLE, LEE ANNE; MPH, 1969, UNIVERSITY OF MICHIGAN; clinical microbiology, procedures for diagnostic bacteriology
SZABO, LA VERNE; MS, 1970, UNIVERSITY OF WASHINGTON; general clinical chemistry, heavy metals in clinical chemistry

Research Assistant Professor

MORISHIMA, CHIHIRO; BA, 1984, WASHINGTON UNIVERSITY; MD, 1988, WASHINGTON UNIVERSITY; pediatric rheumatology
VIEIRA, JEFFERY; PhD, 1988, UNIVERSITY OF MINNESOTA; Biology of Kaposi's sarcoma-associated herpesvirus, gene function and latent to lytic reactivation.

Lecturer

CHEN-LEVY, ZEHAVA; PhD, 1986, WEIZMANN INSTITUTE FOR SCIENCE (ISRAEL); Clinical chemistry, immunology research and laboratory medicine teaching and education
GOODYEAR, NANCY; PhD, 1997, CATHOLIC UNIVERSITY OF AMERICA; clinical microbiology and education
MC DONNEL, LISA M.; MS, 1998, UNIVERSITY OF WASHINGTON; clinical hematology and coagulation, molecular diagnostics, stem cell transplantation, MT education
WILCOCK, CYNTHIA J.; MS, 2001, UNIVERSITY OF WASHINGTON; clinical chemistry and education

MEDEX

Associate Professor

BALLWEG, RUTH A.; BS, 1969, SOUTHERN OREGON STATE COLLEGE; MPA, 1998, UNIVERSITY OF WASHINGTON; women's health issues, physician assistant education
EVANS, TIMOTHY C.; PhD, 1976, UNIVERSITY OF MICHIGAN; diabetes management

Lecturer

GIANOLA, FRED J.; PAsst, 1973, UNIVERSITY OF WASHINGTON; physician assistant education

LANDEL, GRACE P.; BA, 1978, UNIVERSITY OF CALIFORNIA (SANTA CRUZ); MED, 1999, UNIVERSITY OF WASHINGTON; physician assistant education
MORRISON, MONICA L.; BA, 1990, EVERGREEN STATE COLLEGE; Emergency Medicine, Surgery, Family Practice, Medical Education
PLUMMER, WILLIAM T.; BS, 1974, UNIVERSITY OF NEBRASKA; physician assistant education
SCOTT, TERRY B.; PAsst, 1993, UNIVERSITY OF WASHINGTON; physician assistant education, underserved and minority population health care
STOLL, HENRY; BA, 1971, BROWN UNIVERSITY; physician assistant education and professional issues, curriculum development

Medical Education and Biomedical Informatics

Professor

BERRY, DONNA L.; PhD, 1992, UNIVERSITY OF WASHINGTON; health care of persons with, and at risk for, cancer
CARLINE, JAN D.; PhD, 1979, UNIVERSITY OF WASHINGTON; assessment of physician performance, evaluation of medical education programs
DAGGETT, VALERIE D.; PhD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); molecular modelling studies of peptides and proteins
DOHNER, CHARLES W.; PhD, 1966, OHIO STATE UNIVERSITY; program evaluation, administration, faculty development
FULLER, SHERRILYNNE S00; PhD, 1984, UNIVERSITY OF SOUTHERN CALIFORNIA; Analysis, representation and mapping of research findings (data mining.)
GOLDBERG, HAROLD I.; MD, 1977, STANFORD UNIVERSITY; applying clinical informatics to health services delivery and quality improvement
GORDON, MICHAEL J.; PhD, 1973, MICHIGAN STATE UNIVERSITY; family medicine
KALET, IRA J.; PhD, 1968, PRINCETON UNIVERSITY; computer simulation of radiation therapy, artificial intelligence, computer graphics
KIMBALL, ANN M.; MD, 1976, UNIVERSITY OF WASHINGTON; MPH, 1981, UNIVERSITY OF WASHINGTON; emerging infections, public health response to epidemic disease
MATSEN, FREDERICK A.; MD, 1968, BAYLOR UNIVERSITY; orthopaedics, bone and joint research, robotics
NORRIS, THOMAS E.; MD, 1973, UNIVERSITY OF TEXAS (GALVESTON); Clinical applications, health policy and health workforce needs.

OBERLE, MARK W.; MD, 1974, JOHNS HOPKINS UNIVERSITY; Public Health; Native American Health.
SCOTT, CRAIG S.; PhD, 1973, UNIVERSITY OF IOWA; performance-based teaching and evaluation; informatics fluency
SHAPIRO, LINDA G.; PhD, 1974, UNIVERSITY OF IOWA; computer vision, multimedia information systems, medical informatics, pattern recognition
SMITH, CURTIS SCOTT; MD, 1980, UNIVERSITY OF WASHINGTON; general internal medicine
STERN, ERIC J.; MD, 1985, U OF MEDICINE & DENTISTRY OF NEW JERSEY; chest radiology
SURAWICZ, CHRISTINA M.; MD, 1973, UNIVERSITY OF KENTUCKY; gastroenterology.
TARCZY-HORNOCH, PETER; MD, 1989, STANFORD UNIVERSITY; bioinformatics and clinical informatics: clinical systems and integrating genetic databases
WOLF, FREDRIC M.; PhD, 1980, KENT STATE UNIVERSITY; clinical decision making, evaluation of new technology, evidence-based health care

Research Professor

MYLER, PETER J.; PhD, 1982, UNIVERSITY OF QUEENSLAND (AUSTRALIA); regulation of gene expression in protozoan parasites

Associate Professor

ASTION, MICHAEL L.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; neural networks, multi media computer-aided tutorials, immunology
BALLWEG, RUTH A.; MPA, 1998, UNIVERSITY OF WASHINGTON; women's health issues, physician assistant education
BROCK, DOUGLAS MICHAEL; PhD, 1995, UNIVERSITY OF WASHINGTON; usability and human factors
CHOU, DAVID; MD, 1974, UNIVERSITY OF PITTSBURGH; MS, 1979, UNIVERSITY OF MINNESOTA; medical informatics, instrument automation, clinical chemistry
DOCTOR, JASON N.; PhD, 1995, UNIVERSITY OF CALIFORNIA (SAN DIEGO); medical decision making, health economics, decision theory
FINE, JAMES; MD, 1972, UNIVERSITY OF MINNESOTA; MS, 1977, UNIVERSITY OF MINNESOTA; enzymology, medical informatics
KIM, SARA; PhD, 1999, UNIVERSITY OF WASHINGTON; educational technology
PINSKY, LINDA E.; MD, 1989, UNIVERSITY OF WASHINGTON; general internal medicine
ROBINS, LYNNE S.; PhD, 1990, UNIVERSITY OF MICHIGAN; cultural competence, physician-patient communication, qualitative research assessment

SCHAAD, DOUGLAS C.; PhD, 1986, UNIVERSITY OF WASHINGTON; Medical education and evaluation; educational assessment; salmonid recovery; riparian restoration
ZIERLER, BRENDA; PhD, 1996, UNIVERSITY OF WASHINGTON; research in patient with venous thromboembolism; clinical outcomes, process outcomes

Research Associate Professor

JOHNSON, LEONARD CLARK; PhD, 1978, UNIVERSITY OF WASHINGTON; applied research methods including development in applied statistics, assessment, and analysis
MANDEL, LYNN S.; PhD, 1983, UNIVERSITY OF WASHINGTON; assessment of psychomotor skills, program evaluation, study and instrument design

Assistant Professor

KARRAS, BRYANT THOMAS; MD, 1995, UNIVERSITY OF WISCONSIN; public health informatics, guidelines, bioterrorism surveillance
RAKESTRAW, PHILLIP G; PhD, 1981, UNIVERSITY OF WASHINGTON; research in medical education.

Lecturer

AMBROZY, DONNA M.; PhD, 1998, UNIVERSITY OF WASHINGTON; standardized patients, teaching methodology
MACLAREN, CAROL F.; PhD, 1985, UNIVERSITY OF PENNSYLVANIA; educational research
MASUDA, DAVID; MD, 1980, UNIVERSITY OF NORTH DAKOTA; MS, 1996, UNIVERSITY OF WISCONSIN; biomedical and health informatics

Medical History and Ethics

Professor

AUSTIN, MELISSA A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic epidemiology of chronic diseases and public health genetics
BERRYMAN, JACK W; PhD, 1976, UNIVERSITY OF MARYLAND; history of exercise, sports medicine, and health behavior/philosophy
BURKE, WYLIE; PhD, 1974, UNIVERSITY OF WASHINGTON; ethical and policy implications of genetic information
CURTIS, JARED R.; MD, 1988, JOHNS HOPKINS UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; pulmonary diseases and critical care medicine
HUDSON, LEONARD D; MD, 1964, UNIVERSITY OF WASHINGTON; respiratory diseases

JECKER, NANCY A.S.; PhD, 1986, UNIVERSITY OF WASHINGTON; philosophical and ethical aspects of health care delivery and policy
JONSEN, ALBERT R.; PhD, 1967, YALE UNIVERSITY; philosophical, historical values affecting practice and delivery of health care
PEARLMAN, ROBERT A; MD, 1975, BOSTON UNIVERSITY; gerontology
STEVENS, NANCY G; MD, 1979, UNIVERSITY OF WASHINGTON; MPH, 1982, UNIVERSITY OF WASHINGTON; family medicine
SULLIVAN, MARK D.; PhD, 1982, VANDERBILT UNIVERSITY; depression and chronic medical illness, chronic pain, ethics, quality of life
WHORTON, JAMES C; PhD, 1969, UNIVERSITY OF WISCONSIN; history of American medicine, public health, alternative healing

Associate Professor

BACK, ANTHONY L.; MD, 1984, HARVARD UNIVERSITY; oncology
BRADDOCK, CLARENCE H.; MD, 1981, UNIVERSITY OF CHICAGO; doctor-patient communication, informed consent, bioethics education
FARBER, STUART J.; MD, 1974, UNIVERSITY OF WASHINGTON; patient centered communication, palliative/end-of-life care
GALLAGHER, THOMAS H; MD, 1990, HARVARD UNIVERSITY; Ethical and communication dimensions of conflicts of interest in the doctor-patient relationship.
TONELLI, MARK R.; MD, 1989, UNIVERSITY OF COLORADO (BOULDER); pulmonary and critical care medicine

Assistant Professor

FRYER-EDWARDS, KELLY; PhD, 2000, UNIVERSITY OF WASHINGTON; innovation in medical education, professional identity development, clinician-patient relationships
GOERING, SARA L.; PhD, 1998, UNIVERSITY OF COLORADO (DENVER); bioethics, moral philosophy

Lecturer

MC CORMICK, THOMAS R.; DMin, 1976, SOUTHERN METHODIST UNIVERSITY; biomedical ethics, particularly relating to neonatology, and problems related to death and dying.

Medicine

Professor

ABKOWITZ, JANIS L; MD, 1977, HARVARD UNIVERSITY; hematology

ABRASS, CHRISTINE K.; MD, 1973, CASE WESTERN RESERVE UNIVERSITY; nephrology
ABRASS, ITAMAR B.; MD, 1966, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); gerontology
ADEREM, ALAN A.; PhD, 1979, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); signal transduction and the cytoskeleton
AITKEN, MOIRA L.; MBChB, 1978, UNIVERSITY OF EDINBURGH (UK); respiratory disease
ALPERS, CHARLES E.; MD, 1978, UNIVERSITY OF ROCHESTER; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology
ALTMAN, LEONARD; MD, 1969, HARVARD UNIVERSITY; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins
APPELBAUM, FREDERICK R; MD, 1972, TUFTS UNIVERSITY; oncology
ARGENYI, ZSOLT B; MD, 1978, SEMMELWEIS MEDICAL UNIVERSITY (HUNGARY); dermatopathology
AUSTIN, MELISSA A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic epidemiology of chronic diseases and public health genetics
BACK, ANTHONY L.; MD, 1984, HARVARD UNIVERSITY; oncology
BARDY, GUST H; MD, 1977, NORTHWESTERN UNIVERSITY; cardiology
BARNHART, SCOTT; MD, 1979, GEORGE WASHINGTON UNIVERSITY; occupationally related lung disease
BENDITT, JOSHUA O.; MD, 1982, UNIVERSITY OF WASHINGTON; pulmonary and critical care medicine
BENEDETTI, JACQUELINE K; PhD, 1974, UNIVERSITY OF WASHINGTON; statistical methodology in infectious disease research, cancer clinical trials
BENSINGER, WILLIAM I; MD, 1973, NORTHWESTERN UNIVERSITY; oncology
BERG, DANIEL; MD, 1985, UNIVERSITY OF TORONTO (CANADA); dermatological surgery
BIRD, THOMAS D.; MD, 1968, CORNELL UNIVERSITY; neurology, neurogenetics
BLAGG, CHRISTOPHER R; MD, 1954, UNIVERSITY OF LEEDS (UK); MBChB, 1954, UNIVERSITY OF LEEDS (UK); nephrology
BLAU, CARLA A.; MD, 1986, OHIO STATE UNIVERSITY; hematology
BOMSZTYK, KAROL; MD, 1977, UNIVERSITY OF ROCHESTER; role of cytokine-induced protein kinases in the regulation of gene expression
BORNSTEIN, PAUL; MD, 1958, NEW YORK UNIVERSITY; structure and function of connective tissue macromolecules, wound healing
BOYKO, EDWARD J.; MD, 1979, UNIVERSITY OF PITTSBURGH; epidemiology of

- inflammatory bowel disease and non-insulin-dependent diabetes mellitus
- BREMNER, WILLIAM J; PhD, 1977, MONASH UNIVERSITY (AUSTRALIA); endocrinology
- BROUDY, VIRGINIA C.; MD, 1980, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); hematology
- BROWN, B. GREG; PhD, 1969, JOHNS HOPKINS UNIVERSITY; cardiology
- BRUNZELL, JOHN D; MD, 1963, UNIVERSITY OF WASHINGTON; nutritional and metabolic aspects of lipoproteins and diabetes
- BUCHWALD, DEDRA S; MD, 1981, UNIVERSITY OF CALIFORNIA (SAN DIEGO); internal medicine
- BURKE, WYLIE; PhD, 1974, UNIVERSITY OF WASHINGTON; ethical and policy implications of genetic information
- BYERS, PETER H; MD, 1969, CASE WESTERN RESERVE UNIVERSITY; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics
- CALDWELL, JAMES H; MD, 1970, UNIVERSITY OF MISSOURI; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function
- CARITHERS, ROBERT L.; MD, 1969, UNIVERSITY OF PENNSYLVANIA; gastroenterology/hepatology
- CELUM, CONNIE L.; MD, 1984, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); infectious diseases
- CHAIT, ALAN; MD, 1974, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); clinical nutrition with special emphasis on lipid metabolism
- CHAIT, ALAN; MChB, 1967, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); clinical nutrition with special emphasis on lipid metabolism
- CHAMBERLAIN, JEFFREY S; PhD, 1985, UNIVERSITY OF WASHINGTON; neurogenetics, Duchennes muscular dystrophy
- CHARAN, NIRMAL B; MBBS, 1968, CHRISTIAN MEDICAL COLLEGE OF LUDHIANA; respiratory disease
- CHEEVER, MARTIN A; MD, 1970, UNIVERSITY OF MICHIGAN; oncology
- CHESNUT, CHARLES; MD, 1966, UNIVERSITY OF FLORIDA; nuclear medicine
- CLARK, JOAN G; MD, 1974, WASHINGTON UNIVERSITY; pulmonary and respiratory disease
- COBB, LEONARD A; MD, 1952, UNIVERSITY OF MINNESOTA; cardiology
- COLLIER, ANN C; MD, 1978, DARTMOUTH COLLEGE; infectious diseases
- COLLINS, STEVEN J; MD, 1973, COLUMBIA UNIVERSITY; retinoic acid receptors and the pathogenesis of malignancy
- COOMBS, ROBERT W; PhD, 1977, DALHOUSIE UNIVERSITY (CANADA); diagnosis and pathogenesis of HIV infection
- COPASS, MICHAEL K; MA, 1964, NORTHWESTERN UNIVERSITY; MD, 1964, NORTHWESTERN UNIVERSITY; neurology/emergency services
- COREY, LAWRENCE; MD, 1971, UNIVERSITY OF MICHIGAN; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus
- COUNTS, RICHARD B; MD, 1967, WASHINGTON UNIVERSITY; hematology
- COUSER, WILLIAM G; MD, 1965, HARVARD UNIVERSITY; nephrology
- CUMMINS, RICHARD; MD, 1972, CASE WESTERN RESERVE UNIVERSITY; MPH, 1977, UNIVERSITY OF WASHINGTON; emergency medicine
- CURTIS, JARED R.; MD, 1988, JOHNS HOPKINS UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; pulmonary diseases and critical care medicine
- DALE, DAVID C; MD, 1966, HARVARD UNIVERSITY; internal medicine
- DALE-CRUNK, BEVERLY A.; PhD, 1968, UNIVERSITY OF MICHIGAN; keratin biochemistry, epithelial differentiation, antimicrobial peptides
- DAVIS, CONNIE; MD, 1980, UNIVERSITY OF WASHINGTON; nephrology
- DEAN, LARRY S.; MD, 1980, UNIVERSITY OF ALABAMA; cardiology
- DEEG, H. JOACHIM; DrMed, 1972, UNIVERSITY OF BONN (GERMANY); oncology
- DEYO, RICHARD A.; MD, 1975, PENNSYLVANIA STATE UNIVERSITY; health status measurement and evaluation of common medical practices
- DICHEK, DAVID A.; MD, 1984, UNIVERSITY OF CALIFORNIA (LOS ANGELES); cardiology
- DISIS, MARY L.; MS, 1986, UNIVERSITY OF NEBRASKA; MD, 1986, UNIVERSITY OF NEBRASKA; oncology
- DISTECHE, CHRISTINE M; PhD, 1976, UNIVERSITY OF LIEGE (BELGIUM); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics
- DONEY, KRISTINE; MD, 1972, UNIVERSITY OF MICHIGAN; hematology/oncology
- DREWNOWSKI, ADAM; PhD, 1977, ROCKEFELLER UNIVERSITY; taste and psychology of food choice in disease prevention
- DUGDALE, DAVID C.; MD, 1982, UNIVERSITY OF PENNSYLVANIA; general internal medicine
- EISENBERG, MICKEY; PhD, 1978, UNIVERSITY OF WASHINGTON; sudden cardiac arrest and acute myocardial infarction
- ELMORE, JOANN G; MD, 1987, STANFORD UNIVERSITY; MPH, 1992, YALE UNIVERSITY; clinical epidemiology, breast cancer screening, diagnostic accuracy
- ENSINCK, JOHN W; MDCM, 1956, MCGILL UNIVERSITY (CANADA); the role of GI hormones in fuel homeostasis
- FEFER, ALEXANDER; MD, 1964, STANFORD UNIVERSITY; oncology
- FIELDS, STANLEY; PhD, 1981, CAMBRIDGE UNIVERSITY (UK); Yeast Molecular Biology and Genetics
- FIGLEY, MELVIN M; MD, 1944, HARVARD UNIVERSITY; thoracic and pulmonary radiology
- FIHN, STEPHAN; MD, 1977, ST LOUIS UNIVERSITY; MPH, 1981, UNIVERSITY OF WASHINGTON; internal medicine
- FINCH, CLEMENT A; MD, 1941, UNIVERSITY OF ROCHESTER; hematology
- FISHBEIN, DANIEL P; MD, 1980, ALBERT EINSTEIN COLLEGE OF MEDICINE; cardiology
- FLECKMAN, PHILIP H; MD, 1973, WASHINGTON UNIVERSITY; dermatology
- FLEET, WENDELL P.; MD, 1965, CREIGHTON UNIVERSITY; internal medicine
- FUJIMOTO, WILFRED Y; MD, 1965, JOHNS HOPKINS UNIVERSITY; metabolism, endocrinology, nutrition
- GARDNER, GREGORY C.; MD, 1984, BAYLOR UNIVERSITY; rheumatology
- GARTLER, STANLEY M; PhD, 1952, UNIVERSITY OF CALIFORNIA (BERKELEY); mammalian somatic cell genetics with emphasis on the mechanism of x-chromosome inactivation
- GEBALLE, ADAM PHILIP; MD, 1978, DUKE UNIVERSITY; translational regulation of viral and cellular gene expression
- GIBRAN, NICOLE; MD, 1985, BOSTON UNIVERSITY; general, burn, and trauma surgery
- GILLILAND, BRUCE C.; MD, 1960, NORTHWESTERN UNIVERSITY; hematology
- GLENNY, ROBB; MD, 1984, UNIVERSITY OF VIRGINIA; determinants of regional pulmonary blood flow and ventilation distribution
- GLOMSET, JOHN A; MD, 1960, UNIVERSITY OF UPPSALA (SWEDEN); membrane structure and function
- GOLDBERG, HAROLD I.; MD, 1977, STANFORD UNIVERSITY; applying clinical informatics to health services delivery and quality improvement
- GOODNER, CHARLES J; MD, 1955, UNIVERSITY OF UTAH; metabolism and endocrinology
- GREENBERG, PHILIP D; MD, 1971, ST UNIV OF NEW YORK (DOWNSTATE MED CTR); molecular, cellular, viral, and tumor immunology
- GREENE, H LEON; MD, 1969, JOHNS HOPKINS UNIVERSITY; cardiology
- HAMMOND, WILLIAM P; MD, 1972, TUFTS UNIVERSITY; hematology
- HANDSFIELD, HUNTER; MD, 1968, COLUMBIA UNIVERSITY; infectious diseases

- HANSEN, JOHN A.; MD, 1970, STANFORD UNIVERSITY; oncology
- HARLAN, JOHN M.; MD, 1973, UNIVERSITY OF CHICAGO; vascular biology with emphasis on leukocyte-endothelial adhesion
- HAZZARD, WILLIAM R.; MD, 1962, CORNELL UNIVERSITY; gerontology and geriatric medicine
- HEINECKE, JAY W.; MD, 1981, WASHINGTON UNIVERSITY; Oxidative damage of biomolecules
- HEINECKE, JAY W.; BS, 1977, ANTIOCH COLLEGE; Oxidative damage of biomolecules
- HENDERSON, MAUREEN M.; MBBS, 1949, UNIVERSITY OF DURHAM (UK); DPH, 1956, UNIVERSITY OF DURHAM (UK); epidemiology of chronic diseases, dietary prevention of disease
- HENDERSON, WILLIAM R.; MD, 1973, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); allergy and infectious disease
- HILDEBRANDT, JACOB; PhD, 1966, UNIVERSITY OF WASHINGTON; respiratory physiology
- HIRSCH, IRL B.; MD, 1984, UNIVERSITY OF MISSOURI; metabolism and endocrinology/diabetes
- HIRSCHMANN, JAN V.; MD, 1970, UNIVERSITY OF WASHINGTON; internal medicine
- HLASTALA, MICHAEL P.; PhD, 1969, STATE UNIVERSITY OF NEW YORK (BUFFALO); respiratory physiology, inert gas analysis of respiratory function
- HOCKENBERY, DAVID M.; MD, 1982, WASHINGTON UNIVERSITY; gastroenterology
- HOLMES, KING K.; PhD, 1967, UNIVERSITY OF HAWAII; clinical epidemiology and pathogenesis of infectious diseases
- HORWITZ, MARSHALL S.; PhD, 1988, UNIVERSITY OF WASHINGTON; inherited white blood cell disorders, including leukemia
- HUDSON, LEONARD D.; MD, 1964, UNIVERSITY OF WASHINGTON; respiratory diseases
- JARVIK, GAIL P.; PhD, 1986, UNIVERSITY OF MICHIGAN; quantitative genetics and genetic epidemiology, focusing on common diseases
- JONG, ELAINE C.; MD, 1974, UNIVERSITY OF CALIFORNIA (SAN DIEGO); emergency medicine
- KAHN, STEVEN EMANUEL; MBChB, 1978, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); metabolism and endocrinology
- KAVANAGH, TERRANCE J.; PhD, 1985, MICHIGAN STATE UNIVERSITY; free radical toxicology, glutathione metabolism, toxicology and aging
- KENNEDY, J. WARD; MD, 1959, UNIVERSITY OF ROCHESTER; cardiology
- KIMBALL, ANN M.; MD, 1976, UNIVERSITY OF WASHINGTON; MPH, 1981, UNIVERSITY OF WASHINGTON; emerging infections, public health response to epidemic disease
- KIMMEY, MICHAEL; MD, 1979, WASHINGTON UNIVERSITY; gastroenterology/endoscopy
- KING, MARY-CLAIRE; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic analysis of complex human phenotypes, human diversity and evolution
- KIVIAT, NANCY C.; MA, 1970, UNIVERSITY OF WASHINGTON; MD, 1975, UNIVERSITY OF WASHINGTON; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia
- KLEBANOFF, SEYMOUR; PhD, 1954, UNIVERSITY OF LONDON (UK); infectious disease
- KNOPP, ROBERT H.; MD, 1964, CORNELL UNIVERSITY; metabolism and endocrinology
- KOEPSSELL, THOMAS D.; MD, 1972, HARVARD UNIVERSITY; MPH, 1979, UNIVERSITY OF WASHINGTON; injuries, neuroepidemiology, veterans health, epidemiologic methods, program and policy evaluation
- KOWDLEY, KRIS V.; MD, 1985, MT SINAI SCHOOL OF MEDICINE; gastroenterology
- KUDENCHUK, PETER J.; MD, 1979, UNIVERSITY OF WASHINGTON; cardiology
- LAKSHMINARAYAN, S.; MBBS, 1965, ALL-INDIA INSTITUTE OF MEDICAL SCIENCES; pulmonary medicine
- LARSON, ERIC B.; MD, 1973, HARVARD UNIVERSITY; internal medicine
- LEE, SUM PING; PhD, 1978, UNIVERSITY OF AUCKLAND (NEW ZEALAND); gastroenterology
- LEHMANN, KENNETH G.; MD, 1979, UNIVERSITY OF CALIFORNIA (SAN DIEGO); cardiology
- LERNMARK, AKE; PhD, 1971, UNIVERSITY OF UMEA; immunogenetics of organ-specific autoimmunity with emphasis on insulin-dependent diabetes
- LILES, W. CONRAD; PhD, 1987, UNIVERSITY OF WASHINGTON; infectious diseases
- LIPSKY, BENJAMIN A.; MD, 1973, CORNELL UNIVERSITY; internal medicine
- LIVINGSTON, ROBERT B.; MD, 1967, UNIVERSITY OF OKLAHOMA; oncology
- LOGERFO SR., JAMES P.; MD, 1968, UNIVERSITY OF ROCHESTER; MPH, 1974, UNIVERSITY OF WASHINGTON; quality-of-care assessment
- LONGSTRETH JR, W. T.; MD, 1975, UNIVERSITY OF PENNSYLVANIA; MPH, 1982, UNIVERSITY OF WASHINGTON; neurology
- LUKEHART, SHEILA A.; PhD, 1978, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immunology of infectious diseases, microbiology, sexually transmitted diseases
- MANKOFF, DAVID A.; PhD, 1988, UNIVERSITY OF PENNSYLVANIA; HIGH COUNT RATE PET IMAGING
- MANNIK, MART; MD, 1959, CASE WESTERN RESERVE UNIVERSITY; rheumatology
- MARRA, CHRISTINA M.; MS, 1979, OREGON STATE UNIVERSITY; MD, 1984, UNIVERSITY OF OREGON; neurology, infectious diseases.
- MARTIN, PAUL J.; MD, 1974, UNIVERSITY OF PENNSYLVANIA; oncology
- MARTIN, THOMAS R.; MD, 1973, UNIVERSITY OF PENNSYLVANIA; pulmonary medicine
- MATSUMOTO, ALVIN M.; MD, 1975, UNIVERSITY OF WASHINGTON; metabolism and endocrinology
- MC ARTHUR, JAMES R.; MD, 1956, HARVARD UNIVERSITY; hematology
- MC DONALD, GEORGE B.; MD, 1967, WASHINGTON UNIVERSITY; gastroenterology
- MCCORMICK, WAYNE C.; MD, 1983, WASHINGTON UNIVERSITY; gerontology and preventative medicine
- MCELRATH, MARGARET JULIANA; PhD, 1978, MEDICAL UNIVERSITY OF SOUTH CAROLINA; infectious diseases
- MCGEE, STEVE R.; MD, 1980, WASHINGTON UNIVERSITY; general internal medicine
- MENGERT, TERRY J.; MD, 1984, UNIVERSITY OF WASHINGTON; emergency medicine
- MERRIAM, GEORGE R.; MD, 1976, HARVARD UNIVERSITY; metabolism and endocrinology.
- MILLER, SAMUEL I.; MD, 1979, BAYLOR UNIVERSITY; Salmonella pathogenesis and bacterial-eucaryotic cell interactions.
- MOTULSKY, ARNO G.; MD, 1947, UNIVERSITY OF ILLINOIS; medical genetics
- MULLINS, JAMES I.; PhD, 1978, UNIVERSITY OF MINNESOTA; retroviruses and AIDS, molecular virology
- NEIMAN, PAUL E.; MD, 1964, UNIVERSITY OF WASHINGTON; oncology
- NELP, WIL B.; MD, 1955, JOHNS HOPKINS UNIVERSITY; nuclear medicine
- NELSON, JUDITH LEE; MD, 1977, UNIVERSITY OF CALIFORNIA (DAVIS); rheumatology
- NGUYEN, TOAN D.; MD, 1978, UNIVERSITY OF CHICAGO; gastroenterology
- NOLAN, CHARLES M.; MD, 1969, UNIVERSITY OF ARKANSAS; infectious diseases.
- NORRIS, THOMAS E.; MD, 1973, UNIVERSITY OF TEXAS (GALVESTON); Clinical applications, health policy and health workforce needs.
- OLERUD, JOHN E.; MD, 1971, UNIVERSITY OF WASHINGTON; dermatology
- OLSON, MAYNARD V.; PhD, 1970, STANFORD UNIVERSITY; Methods and applications of large-scale DNA analysis

- OTTO, CATHERINE M.; BA, 1975, REED COLLEGE; MD, 1979, UNIVERSITY OF WASHINGTON; cardiology
- OXORN, DONALD C.; MD, 1978, MCGILL UNIVERSITY (CANADA); trauma and critical care
- PAAUW, DOUGLAS; MD, 1979, UNIVERSITY OF WASHINGTON; general internal medicine
- PAGE, RICHARD L; MD, 1984, DUKE UNIVERSITY; Cardiology, especially heart rhythm disturbances and sudden death
- PAGON, ROBERTA A; MD, 1972, HARVARD UNIVERSITY; medical genetics
- PALMER, JERRY P; MD, 1970, STATE UNIV OF NEW YORK (UPSTATE MED CT); metabolism and endocrinology, diabetes
- PAULSEN, C ALVIN; MD, 1952, UNIVERSITY OF OREGON; metabolism and endocrinology
- PEARLMAN, ALAN S; MD, 1970, HARVARD UNIVERSITY; cardiology
- PEARLMAN, ROBERT A; MD, 1975, BOSTON UNIVERSITY; gerontology
- PETERSDORF, EFFIE WANG; MD, 1982, MCGILL UNIVERSITY (CANADA); oncology
- PIERSON, DAVID JOHN; MD, 1969, JOHNS HOPKINS UNIVERSITY; respiratory diseases.
- PLORDE, JAMES J; MD, 1959, UNIVERSITY OF MINNESOTA; infectious diseases, antibiotic-resistant nosocomial infections
- POPE, CHARLES E; MD, 1957, CASE WESTERN RESERVE UNIVERSITY; gastroenterology.
- PORTE, DANIEL; MD, 1957, UNIVERSITY OF CHICAGO; metabolism and endocrinology.
- PRESS, OLIVER W.; PhD, 1977, UNIVERSITY OF WASHINGTON; treatment of hematologic malignancies with monoclonal antibody immunoconjugates
- PRICE, THOMAS H.; MD, 1966, JOHNS HOPKINS UNIVERSITY; hematology.
- PROBSTFIELD, JEFFREY L.; MD, 1967, UNIVERSITY OF WASHINGTON; cardiology
- PSATY, BRUCE M.; PhD, 1979, INDIANA UNIVERSITY; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology
- RADICH, JERALD P; MS, 1979, HARVARD UNIVERSITY; MD, 1983, UNIVERSITY OF CALIFORNIA (DAVIS); oncology
- RAGHU, GANESH; MD, 1974, UNIVERSITY OF MYSORE (INDIA); respiratory disease.
- RAMSEY, PAUL G; MD, 1975, HARVARD UNIVERSITY; infectious diseases, internal medicine.
- RAMSEY, SCOTT D.; PhD, 1994, UNIVERSITY OF PENNSYLVANIA; economics in medicine
- RASKIND, WENDY H; PhD, 1977, UNIVERSITY OF WASHINGTON; medical genetics.
- RAUGI, GREGORY J; PhD, 1975, DUKE UNIVERSITY; dermatology.
- REID, BRIAN J; PhD, 1975, UNIVERSITY OF WASHINGTON; genetic and cell cycle abnormalities in neoplastic progression in Barrett's esophagus
- RIDDELL, STANLEY R.; MD, 1979, UNIVERSITY OF MANITOBA (CANADA); oncology
- RITCHIE, JAMES L; MD, 1967, CASE WESTERN RESERVE UNIVERSITY; cardiology.
- ROBERTSON, H. THOMAS; MD, 1968, HARVARD UNIVERSITY; respiratory diseases
- ROSEN, HENRY; MD, 1972, UNIVERSITY OF ROCHESTER; allergy and infectious diseases.
- ROTH, GERALD J.; MD, 1967, HARVARD UNIVERSITY; hematology.
- RUBIN, CYRUS E; MD, 1945, HARVARD UNIVERSITY; gastroenterology.
- RUSSELL, DAVID WILLIAM; PhD, 1988, ROCKEFELLER UNIVERSITY; hematology
- SANDMAIER, BRENDA M.; MD, 1983, UNIVERSITY OF ALBERTA (CANADA); oncology
- SAUNDERS, DAVID R; MD, 1957, MCGILL UNIVERSITY (CANADA); intestinal absorption, effect of drugs on G.I. mucosa
- SCHUFFLER, MICHAEL D; MD, 1966, UNIVERSITY OF ILLINOIS; gastroenterology.
- SCHWARTZ, MICHAEL W; MD, 1983, RUSH MEDICAL COLLEGE; metabolism and endocrinology.
- SCHWARTZ, ROBERT S; MD, 1974, OHIO STATE UNIVERSITY; internal medicine and geriatrics
- SCHWARTZ, STEPHEN MARK; PhD, 1973, UNIVERSITY OF WASHINGTON; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics
- SCOTT, C RONALD; MD, 1959, UNIVERSITY OF WASHINGTON; diagnosis and nutritional management of genetic disorders of children
- SHANKLAND, STUART J; MBChB, 1983, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); nephrology
- SHEFFIELD, JOHN V.L.; MD, 1989, HARVARD UNIVERSITY; general internal medicine
- SHERRARD, DONALD J; MD, 1960, UNIVERSITY OF WASHINGTON; nephrology.
- SILVERSTEIN, FRED; MD, 1967, COLUMBIA UNIVERSITY; gastroenterology.
- SIMKIN, PETER A; MD, 1961, UNIVERSITY OF PENNSYLVANIA; rheumatology.
- SISCOVICK, DAVID S.; MD, 1976, UNIVERSITY OF MARYLAND; epidemiology
- SLATTERY, JOHN T; PhD, 1978, STATE UNIVERSITY OF NEW YORK (BUFFALO); pharmacokinetics/pharmacodynamics of alkylating agents, oncology/ bone marrow transplant
- SLICHTER, SHERRILL J; MD, 1963, GEORGE WASHINGTON UNIVERSITY; hematology.
- SMITH, CHARLES B.; MD, 1962, HARVARD UNIVERSITY; infectious diseases.
- SMITH, CURTIS SCOTT; MD, 1980, UNIVERSITY OF WASHINGTON; general internal medicine
- SPACH, DAVID H; MD, 1986, DUKE UNIVERSITY; infectious diseases
- SPENCE, ALEXANDER M; MD, 1965, UNIVERSITY OF CHICAGO; neurology, neuro-oncology.
- STAMATOYANNOPOULOS, G; MD, 1958, UNIVERSITY OF ATHENS (GREECE); DrMedSci, 1960, UNIVERSITY OF ATHENS (GREECE); medical genetics.
- STAMATOYANNOPOULOS, THALIA; MD, 1961, UNIVERSITY OF ATHENS (GREECE); DrMedSci, 1964, UNIVERSITY OF ATHENS (GREECE); hematology
- STAMM, WALTER E; MD, 1971, HARVARD UNIVERSITY; infectious disease
- STARKEBAUM, GORDON A; MD, 1970, COLUMBIA UNIVERSITY; rheumatology.
- STERN, ERIC J.; MD, 1985, U OF MEDICINE & DENTISTRY OF NEW JERSEY; chest radiology
- STEVENS, DENNIS L; PhD, 1967, MONTANA STATE UNIVERSITY; infectious diseases.
- STEWART, DOUGLAS; MD, 1965, HARVARD UNIVERSITY; cardiology.
- STEWART, FORREST MARC; MD, 1997, INDIANA UNIVERSITY; oncology
- STORB, RAINER F; MD, 1960, UNIVERSITY OF FREIBURG (GERMANY); oncology.
- STRATTON, JOHN R; MD, 1973, YALE UNIVERSITY; cardiology.
- SULLIVAN, SEAN; PhD, 1992, UNIVERSITY OF CALIFORNIA (BERKELEY); health economics, pharmaceutical outcomes research and health policy
- SURAWICZ, CHRISTINA M.; MD, 1973, UNIVERSITY OF KENTUCKY; gastroenterology.
- SWANSON, PHILLIP D; PhD, 1964, UNIVERSITY OF LONDON (UK); movement disorders, neurology
- SWENSON, ERIK R.; MD, 1979, UNIVERSITY OF CALIFORNIA (SAN DIEGO); pulmonary medicine.
- SYBERT, VIRGINIA; MD, 1974, STATE UNIVERSITY OF NEW YORK (BUFFALO); genetics and dermatology
- TAIT, JONATHAN F; PhD, 1983, WASHINGTON UNIVERSITY; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders
- THOMAS, E DONNALL; MA, 1943, UNIVERSITY OF TEXAS (AUSTIN); MD, 1946, HARVARD UNIVERSITY; oncology.

THOMPSON, ARTHUR R; PhD, 1972, UNIVERSITY OF WASHINGTON; hematology.

THOMPSON, JOHN A.; MD, 1979, UNIVERSITY OF ALABAMA; oncology.

TOROK-STORB, BEVERLY J; PhD, 1975, UNIVERSITY OF PITTSBURGH; hematology.

TURCK, MARVIN; MD, 1959, UNIVERSITY OF ILLINOIS; infectious diseases.

VAN CITTERS, ROBERT L.; MD, 1953, UNIVERSITY OF KANSAS; cardiovascular physiology

VAN VOORHIS, WESLEY C; PhD, 1983, ROCKEFELLER UNIVERSITY; infectious diseases.

VESTAL, ROBERT E; MD, 1971, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); gerontology.

WALLACE, JAMES F.; MD, 1961, WASHINGTON UNIVERSITY; internal medicine.

WATERSTON, ROBERT H; PhD, 1972, PRINCETON UNIVERSITY; DNA sequencing and comparative gene analysis

WATKINS, SANDRA L; MD, 1981, UNIVERSITY OF TEXAS (HOUSTON); nephrology

WEIGLE, DAVID S; MD, 1978, HARVARD UNIVERSITY; endocrinology and metabolism.

WENER, MARK H; MD, 1974, WASHINGTON UNIVERSITY; diagnostic immunology, immune complex diseases

WIPF, JOYCE E.; MD, 1984, UNIVERSITY OF MINNESOTA; general internal medicine.

WITHERSPOON, ROBERT P; MS, 1970, BAYLOR UNIVERSITY; MD, 1970, BAYLOR UNIVERSITY; oncology.

WOOD, ROBERT W; MD, 1970, UNIVERSITY OF ROCHESTER; internal medicine.

YEUNG, RAYMOND S.; MD, 1982, UNIVERSITY OF TORONTO (CANADA); general and surgical oncology

ZAGER, RICHARD A.; MD, 1969, NORTHWESTERN UNIVERSITY; nephrology.

Research Professor

ALBERS, JOHN J.; PhD, 1969, UNIVERSITY OF ILLINOIS; lipoprotein metabolism and pathophysiology

BASKIN, DENIS G.; PhD, 1969, UNIVERSITY OF CALIFORNIA (BERKELEY); neuroendocrinology; obesity; CNS regulation of body weight; histochemistry; expression of receptors

DEEB, SAMIR S.; PhD, 1964, UNIVERSITY OF ILLINOIS; genetic factors predisposing to hyperlipidemia and coronary artery disease

FURLONG, CLEMENT E.; PhD, 1968, UNIVERSITY OF CALIFORNIA (DAVIS); human biochemical genetics in biochemistry of membrane transport systems

LATTEMANN, DIANNE; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); Effect of Regulatory Paptides on Feeding and Behavior and Metabolism

LEBOEUF, RENEE C.; PhD, 1985, HARVARD UNIVERSITY; genetic and nutritional regulation of proteins involved in lipid transport

LI, QILIANG; PhD, 1962, UNIVERSITY OF SHANDONG (CHINA); medical genetics.

MARCOVINA, SANTICA M.; PhD, 1972, UNIVERSITY OF PAVIA (ITALY); PhD, 1975, UNIVERSITY OF URBINO (ITALY); metabolism and endocrinology.

MCTIERNAN, ANNE; PhD, 1982, UNIVERSITY OF WASHINGTON; breast and colon cancer, womens health, exercise and obesity

ORAM, JOHN FISHER; PhD, 1972, PENNSYLVANIA STATE UNIVERSITY; cellular lipid transport and metabolism; lipoprotein interactions

SCHELLENBERG, GERARD D; PhD, 1978, UNIVERSITY OF CALIFORNIA (RIVERSIDE); mapping of familial Alzheimer disease genes and cloning of Werner's syndrome gene

SHEEHAN, FLORENCE; MD, 1975, UNIVERSITY OF CHICAGO; cardiology.

STEPHENS, KAREN G.; PhD, 1982, INDIANA UNIVERSITY; molecular genetics of human disease; human gene mapping

WIJSMAN, ELLEN M; PhD, 1981, UNIVERSITY OF WISCONSIN; human quantitative and population genetics

Associate Professor

AHMAD, SUHAIL; MBBS, 1968, UNIVERSITY OF ALLAHABAD (INDIA); nephrology

AMORY, JOHN K.; MD, 1994, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); endocrinology

ANAWALT, BRADLEY D; MD, 1989, UNIVERSITY OF CALIFORNIA (DAVIS); general internal medicine

BECKER, PAMELA S; PhD, 1986, HARVARD UNIVERSITY; Hematopoietic stem cell gene transfer, anemias, marrow transplantation, and acute leukemia

BELCHER, DONALD W; MD, 1962, UNIVERSITY OF PENNSYLVANIA; ambulatory medicine

BOECKH, MICHAEL J. J.; MD, 1985, FREIE UNIVERSITÄT OF BERLIN (GERMANY); allergy and infectious diseases

BRADLEY, KATHARINE A; MD, 1987, STANFORD UNIVERSITY; MPH, 1993, UNIVERSITY OF WASHINGTON; general internal medicine

BRENTNALL, TERESA A.; MD, 1987, UNIVERSITY OF WASHINGTON; gastroenterology

BRODKIN, CARL; MD, 1983, UNIVERSITY OF COLORADO (DENVER); hepatic effects of occupational solvent exposure;

ventilatory decline in asbestos-exposed workers

BRODKIN, KAYLA I; MD, 1982, STATE UNIV OF NEW YORK (STONY BROOK); gerontology and geriatric medicine

BUCKNER, FREDERICK S.; MD, 1988, UNIVERSITY OF WASHINGTON; Infectious diseases

CARVALHO, PAULA G.; MD, 1984, UNIVERSITY OF WASHINGTON; pulmonary and critical care medicine

CHAUNCEY, THOMAS R.; MD, 1985, RUSH MEDICAL COLLEGE; oncology

CHENG, EDITH Y.; MS, 1979, SARAH LAWRENCE COLLEGE; MD, 1987, UNIVERSITY OF WASHINGTON; genetics, perinatal medicine

CHILDS, MARIAN T; PhD, 1950, UNIVERSITY OF CALIFORNIA (BERKELEY); nutrition

CLURMAN, BRUCE E.; PhD, 1988, CORNELL UNIVERSITY; oncology

COLVEN, ROY M.; MD, 1987, UNIVERSITY OF WASHINGTON; dermatology

CORSON, MARSHALL A.; MD, 1981, BAYLOR UNIVERSITY; cardiology

CULVER, BRUCE H; MD, 1969, UNIVERSITY OF WASHINGTON; respiratory diseases

CUMMINGS, DAVID E.; MD, 1987, HARVARD UNIVERSITY; genetic determinants of obesity. Interplay between body weight and reproduction

CUSACK, BARRY J.; MD, 1980, UNIVERSITY COLLEGE OF DUBLIN (IRELAND); gerontology

DANIELL, WILLIAM E; MD, 1979, TUFTS UNIVERSITY; MPH, 1986, UNIVERSITY OF WASHINGTON; noise-induced hearing loss; long-term disability associated with carpal tunnel syndrome

DAVIDSON, ROBERT C; MD, 1953, UNIVERSITY OF WASHINGTON; nephrology

DEEM, STEVEN A.; MD, 1984, SOUTHERN ILLINOIS UNIVERSITY; critical care

DEWITT, DAWN E.; MD, 1990, HARVARD UNIVERSITY; general internal medicine

DOLACK, GEORGE L.; MD, 1981, UNIVERSITY OF WASHINGTON; cardiology

DOMINITZ, JASON A; MD, 1991, UNIVERSITY OF MARYLAND; MS, 1996, DUKE UNIVERSITY; gastroenterology

DRACHMAN, JONATHAN; MD, 1989, HARVARD UNIVERSITY; hematology

DUCHIN, JEFFREY S.; MD, 1985, RUTGERS UNIVERSITY; infectious diseases and epidemiology

DUGOWSON, CARIN E.; MD, 1976, UNIVERSITY OF ILLINOIS; MPH, 1986, UNIVERSITY OF WASHINGTON; rheumatology

ELLIS, GEORGIANA K.; MD, 1982, UNIVERSITY OF WASHINGTON; oncology

EVANS, TIMOTHY C; PhD, 1976, UNIVERSITY OF MICHIGAN; diabetes management

- EVERY, NATHAN R.; MD, 1988, EMORY UNIVERSITY; MPH, 1993, UNIVERSITY OF WASHINGTON; cardiology
- FIFE, LAURA E.; MD, 1979, UNIVERSITY OF UTAH; emergency medicine
- FITZGIBBON, DERMOT R.; MBBChir, 1983, CORK REGIONAL HOSPITAL; pain management
- FRANK, LEONARD R.; MD, 1988, ALBANY MEDICAL COLLEGE; emergency medicine
- GALLAGHER, THOMAS H.; MD, 1990, HARVARD UNIVERSITY; Ethical and communication dimensions of conflicts of interest in the doctor-patient relationship.
- GASTER, BARAK; MD, 1993, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); general internal medicine
- GERNSHEIMER, TERRY B.; MD, 1979, STATE UNIV OF NEW YORK (STONY BROOK); hematology
- GILL, EDWARD A.; MD, 1984, UNIVERSITY OF WASHINGTON; cardiology
- GILLIGAN, DIANA MARY; PhD, 1985, ALBERT EINSTEIN COLLEGE OF MEDICINE; hematology
- GOLDBERG, STEVEN L.; MD, 1984, UNIVERSITY OF KANSAS; cardiology
- GOLDEN, MATTHEW R.; MPH, 1993, JOHNS HOPKINS UNIVERSITY; MD, 1994, JOHNS HOPKINS UNIVERSITY; allergy and infectious diseases
- GOLDSTEIN, ERIKA A.; MD, 1981, UNIVERSITY OF ROCHESTER; general internal medicine
- GOODMAN, RICHARD B.; MD, 1982, UNIVERSITY OF OKLAHOMA; pulmonary and critical care medicine
- GOSS, J. RICHARD; MD, 1987, OREGON HEALTH SCIENCES UNIVERSITY; MPH, 1995, UNIVERSITY OF WASHINGTON; internal medicine
- GRALOW, JULIE R.; MD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; oncology
- GREENBAUM, CARLA J.; MD, 1981, BROWN UNIVERSITY; metabolism, endocrinology and nutrition
- GREENBERG, DEBORAH L.; MD, 1990, WASHINGTON UNIVERSITY; general internal medicine
- GRETCH, DAVID R.; PhD, 1990, UNIVERSITY OF IOWA; research and diagnostics related to viral hepatitis
- GRUENEWALD, DAVID A.; MD, 1983, UNIVERSITY OF CHICAGO; gerontology and geriatric medicine.
- HARRINGTON, ROBERT D.; MD, 1983, TUFTS UNIVERSITY; teaching and research studies involving HIV entry into CD4 cells
- HAYCOX, CLAIRE L.; PhD, 1992, UNIVERSITY OF WASHINGTON; dermatology
- HIGANO, CELESTIA S.; MD, 1979, UNIVERSITY OF MASSACHUSETTS; oncology
- HILLSON, JAN L.; MD, 1980, STANFORD UNIVERSITY; rheumatology.
- HOLMBERG, LEONA A.; MD, 1986, UNIVERSITY OF MIAMI (FLORIDA); oncology
- HORNUNG, ROBIN L.; MD, 1990, YALE UNIVERSITY; MPH, 1996, UNIVERSITY OF NORTH CAROLINA; dermatology
- JACKSON, J. CAREY; MPH, 1980, UNIVERSITY OF HAWAII; MD, 1986, MICHIGAN STATE UNIVERSITY; general internal medicine
- JOHN STEWART, GRACE C.; MD, 1987, UNIVERSITY OF MICHIGAN; MPH, 1995, UNIVERSITY OF WASHINGTON; mother-to-child HIV-1 transmission (specifically, Africa, cofactors, breastmilk)
- JOHNSON, KAY M.; MD, 1991, UNIVERSITY OF MINNESOTA; general internal medicine
- KAPUR, VISHESH; MD, 1989, YALE UNIVERSITY; pulmonary and critical-care medicine
- KAUFMAN, JOEL D.; MD, 1986, UNIVERSITY OF MICHIGAN; MPH, 1990, UNIVERSITY OF WASHINGTON; occupational and environmental epidemiology: etiologic research and public health surveillance
- KEARNEY, DAVID J.; MD, 1989, UNIVERSITY OF MISSOURI; gastroenterology
- KEIFER, MATTHEW C.; MD, 1982, UNIVERSITY OF ILLINOIS; the human health effects of pesticide exposure
- KENT, DANIEL L.; MD, 1978, UNIVERSITY OF ROCHESTER; internal medicine.
- KIEM, HANS-PETER; MD, 1987, UNIVERSITY OF ULM (GERMANY); oncology/hematology
- KITAHATA, MARI M.; MD, 1987, UNIVERSITY OF PENNSYLVANIA; MPH, 1995, UNIVERSITY OF WASHINGTON; allergy and infectious diseases
- KOELLE, DAVID; MD, 1985, UNIVERSITY OF WASHINGTON; allergy and infectious diseases
- KUVER, RAHUL P.; MD, 1989, UNIVERSITY OF MICHIGAN; gastroenterology
- LAFFERTY, WILLIAM E.; MD, 1978, UNIVERSITY OF KANSAS; STDs, HIV/AIDS, surveillance and epidemiology of STD, managed care
- LAMPE, MARY F.; PhD, 1984, UNIVERSITY OF NORTH CAROLINA; medical technology education, molecular analysis of Chlamydia trachomatis
- LARSON, ANNE M.; MD, 1991, UNIVERSITY OF WASHINGTON; gastroenterology
- LAYA, MARY B.; MD, 1982, CREIGHTON UNIVERSITY; MPH, 1995, UNIVERSITY OF WASHINGTON; general internal medicine
- LESSLER, DANIEL; MD, 1986, STANFORD UNIVERSITY; MHA, 1992, UNIVERSITY OF WASHINGTON; health services research pertaining to cost-effectiveness, quality of care, medical management
- LEVY, WAYNE C.; MD, 1985, LOMA LINDA UNIVERSITY; cardiology
- LINDNER, ARMANDO; MD, 1964, UNIVERSITY OF BUENOS AIRES (ARGENTINA); nephrology
- LINENBERGER, MICHAEL L.; MD, 1982, UNIVERSITY OF KANSAS; hematology
- LINGAPPA, JAISRI; PhD, 1985, HARVARD UNIVERSITY; cell biology of virus assembly; host proteins involved in assembly of HIV and other viruses
- LINKER, DAVID T.; MD, 1976, STANFORD UNIVERSITY; diagnostic ultrasound in cardiology and cardiovascular pathophysiology
- LIPKIN, EDWARD W.; PhD, 1977, CASE WESTERN RESERVE UNIVERSITY; mineral metabolism, nutrition support, non-human primate physiology
- MADTES, DAVID K.; MD, 1979, UNIVERSITY OF PITTSBURGH; pulmonary and critical care medicine
- MALONEY, DAVID G.; PhD, 1991, STANFORD UNIVERSITY; medical oncology
- MARR, KIEREN A.; MD, 1993, HAHNEMANN MEDICAL COLLEGE; Fungal infections in immunocompromised hosts; Pathogenesis of aspergillosis
- MARRAZZO, JEANNE M.; MD, 1988, JEFFERSON MEDICAL COLLEGE; MPH, 1994, UNIVERSITY OF WASHINGTON; infectious diseases
- MARTIN, GARY V.; MD, 1980, UNIVERSITY OF ARIZONA; cardiology
- MARTIN, THOMAS G.; MD, 1977, PENNSYLVANIA STATE UNIVERSITY; general internal medicine
- MC MULLEN, W RUSSELL; MD, 1978, UNIVERSITY OF CINCINNATI; internal medicine, emergency medicine
- MIGEON, MARY; MD, 1993, UNIVERSITY OF WASHINGTON; general internal medicine
- MILLER, RICHARD A.; MD, 1977, HARVARD UNIVERSITY; infectious diseases
- MONTGOMERY, ROBERT B.; MD, 1987, DUKE UNIVERSITY; oncology
- MUCZYNSKI, KIMBERLY ANN; PhD, 1984, UNIVERSITY OF WASHINGTON; nephrology
- NARITA, MASAHIRO; MD, 1988, KEIO UNIVERSITY (JAPAN); Tuberculosis and mycobacterial disease
- NASH, RICHARD A.; MD, 1977, UNIVERSITY OF MANITOBA (CANADA); oncology
- NELSON, PETER S.; MD, 1986, UNIVERSITY OF KANSAS; the study of human carcinogenesis using tools of genomics and bioinformatics
- NEUZIL, KATHLEEN M.; MD, 1987, JOHNS HOPKINS UNIVERSITY; MPH, 1998, VANDERBILT UNIVERSITY; allergy and infectious diseases
- NOBLE, WILLIAM S.; PhD, 1998, UNIVERSITY OF CALIFORNIA (SAN DIEGO); the development of machine learning techniques for application to problems in molecular biology

- O'BRIEN, KEVIN; MD, 1984, UNIVERSITY OF WASHINGTON; cardiology
- ODLAND, PETER B; MD, 1984, CHICAGO MEDICAL SCHOOL; dermatologic surgery
- OTT, SUSAN M; MD, 1974, UNIVERSITY OF WASHINGTON; nephrology
- PARK, DAVID R.; MD, 1988, UNIVERSITY OF VERMONT; pulmonary and critical care medicine
- PETERSDORF, STEPHEN H; MD, 1983, BROWN UNIVERSITY; oncology
- PINSKY, LINDA E; MD, 1989, UNIVERSITY OF WASHINGTON; general internal medicine
- POOLE, JEANNE E; MD, 1980, UNIVERSITY OF WASHINGTON; cardiology.
- POWELL, HEIDI SARA; MS, 1980, OREGON STATE UNIVERSITY; MD, 1986, OREGON HEALTH SCIENCES UNIVERSITY; general internal medicine
- RALPH, DAVID D; MD, 1972, STANFORD UNIVERSITY; respiratory diseases.
- REA, THOMAS D.; MD, 1992, UNIVERSITY OF MICHIGAN; cardiovascular disease and prehospital emergency care
- REED, MAY J.; MD, 1986, HARVARD UNIVERSITY; geriatric medicine and gerontology
- REILLY, DOMINIC F.; MD, 1988, UNIVERSITY OF WASHINGTON; general internal medicine
- RHOADS, CAROLINE S; MD, 1989, UNIVERSITY OF PENNSYLVANIA; general internal medicine
- RUBENFELD, GORDON; MD, 1987, JEFFERSON MEDICAL COLLEGE; MPH, 1996, UNIVERSITY OF WASHINGTON; pulmonary and critical care medicine
- RYAN, MICHAEL J.; MD, 1986, UNIVERSITY OF MICHIGAN; nephrology
- SABATH, DANIEL E.; PhD, 1989, UNIVERSITY OF PENNSYLVANIA; regulation of gene expression in hematopoietic cells
- SASSO, ERIC H.; MD, 1980, UNIVERSITY OF CALIFORNIA (SAN DIEGO); rheumatology.
- SCHMIDT, RODNEY; PhD, 1984, UNIVERSITY OF WASHINGTON; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy
- SCHNAPP, LYNN M.; MD, 1986, UNIVERSITY OF PENNSYLVANIA; pulmonary and critical care medicine
- SCHUBACH, WILLIAM H.; PhD, 1971, UNIVERSITY OF CALIFORNIA (SANTA CRUZ); oncology
- SEKIJIMA, JOHN; MD, 1983, UNIVERSITY OF WASHINGTON; gastroenterology
- SHUHART, MARGARET C.; MD, 1988, DARTMOUTH COLLEGE; gastroenterology
- SKERRETT, SHAWN J.; MD, 1978, NEW YORK UNIVERSITY; pulmonary and critical care medicine
- STADIUS, MICHAEL L.; MD, 1978, UNIVERSITY OF OREGON; cardiology
- STAIGER, THOMAS O.; MD, 1985, UNIVERSITY OF WASHINGTON; general internal medicine
- STAPLETON, ANN E.; MD, 1984, ALBERT EINSTEIN COLLEGE OF MEDICINE; allergy and infectious diseases
- STEINBACH, GIDEON; MD, 1981, ALBERT EINSTEIN COLLEGE OF MEDICINE; gastroenterology
- STEINBERG, KENNETH P; MD, 1985, NEW YORK MEDICAL COLLEGE; pulmonary and critical care medicine
- STIVELMAN, JOHN C.; MD, 1978, UNIVERSITY OF PENNSYLVANIA; nephrology
- SUGG, NANCY K; MD, 1983, UNIVERSITY OF MARYLAND; internal medicine
- SUTTON, PAUL R.; PhD, 1992, UNIVERSITY OF ILLINOIS; internal medicine
- THOMPSON, WILLIAM H.; MD, 1988, JOHNS HOPKINS UNIVERSITY; pulmonary and critical care medicine
- TOBIN, RICHARD W.; MD, 1987, UNIVERSITY OF TEXAS (SOUTHWESTERN); gastroenterology
- TONELLI, MARK R.; MD, 1989, UNIVERSITY OF COLORADO (BOULDER); pulmonary and critical care medicine
- TRENCE, DACE L.; MD, 1997, UNIVERSITY OF MINNESOTA; endocrinology
- TU, SHIN-PING; MD, 1989, UNIVERSITY OF CINCINNATI; MPH, 1996, UNIVERSITY OF WASHINGTON; general internal medicine
- TUNG, BRUCE Y.; MD, 1992, UNIVERSITY OF CHICAGO; gastroenterology
- UHLMANN, RICHARD F; MD, 1978, UNIVERSITY OF CHICAGO; gerontology.
- WALD, ANNA; MD, 1985, MT SINAI SCHOOL OF MEDICINE; MPH, 1994, UNIVERSITY OF WASHINGTON; the epidemiology, natural history and therapeutics of HSV and other herpesviruses infections
- WATANABE, JILL M.; MD, 1990, JOHNS HOPKINS UNIVERSITY; MPH, 1991, JOHNS HOPKINS UNIVERSITY; general internal medicine
- WONG, EMILY Y.; MD, 1990, UNIVERSITY OF WASHINGTON; internal medicine
- WOOD, FRANCIS C; MD, 1954, HARVARD UNIVERSITY; metabolism and endocrinology
- WU, DANIEL Y.; PhD, 1990, LOMA LINDA UNIVERSITY; oncology
- YEE, CASSIAN; MD, 1986, UNIVERSITY OF MANITOBA (CANADA); oncology
- ZUNT, JOSEPH R.; MD, 1991, UNIVERSITY OF MINNESOTA; MPH, 1998, UNIVERSITY OF WASHINGTON; infectious disease, neuroepidemiology of AIDS/HIV
- HANSEN, RALPH S.; PhD, 1986, UNIVERSITY OF WASHINGTON; medical genetics
- KAUL, RAJINDER; PhD, 1979, UNIVERSITY OF LUCKNOW (INDIA); Genomics technologies, finishing, long-range resequencing, genetic variations, disease and phenotype
- OLSON, RICHARD D.; PhD, 1978, VANDERBILT UNIVERSITY; metabolism and endocrinology.
- PRESLAND, RICHARD B; PhD, 1987, UNIVERSITY OF ADELAIDE (AUSTRALIA); epithelial/epidermal differentiation, genetic diseases, regulation of development
- QUINN, LEBRIS S; PhD, 1982, UNIVERSITY OF WASHINGTON; control of muscle precursor cell proliferation and differentiation; muscle growth

Assistant Professor

- ALTEMEIER, WILLIAM A.; MD, 1992, VANDERBILT UNIVERSITY; Acute lung injury and co-regulation of transcriptional responses to inflammatory stimuli
- AU, DAVID H.; MD, 1993, UNIVERSITY OF CHICAGO; Chronic Lung Disease, Pharmacoepidemiology, Health services research, Communication
- BAERNSTEIN, AMY; MD, 1993, CORNELL UNIVERSITY; internal and emergency medicine, medical education
- BEATY, CHRISTOPHER D.; MD, 1983, UNIVERSITY OF VERMONT; pulmonary and critical care medicine
- DELLIT, TIMOTHY H.; MD, 1997, CORNELL UNIVERSITY; Emergence of antimicrobial resistance and the prudent use of antimicrobials
- FARQUHAR, CAREY; MD, 1994, HARVARD UNIVERSITY; MPH, 2001, UNIVERSITY OF WASHINGTON; HIV in Kenya: mother-to-child HIV transmission, correlates of immunity to HIV, couple counseling
- FERO, MATTHEW L.; MD, 1990, UNIVERSITY OF CALIFORNIA (IRVINE); oncology
- FIRESTONE, JORDAN A.; PhD, 1993, UNIVERSITY OF COLORADO (BOULDER); neurotoxicology
- FREDRICKS, DAVID N.; MD, 1990, CASE WESTERN RESERVE UNIVERSITY; allergy and infectious diseases
- GAUTHIER, VERLENE JOYCE; PhD, 1984, UNIVERSITY OF WASHINGTON; rheumatology
- GEORGES, GEORGE E; MD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); oncology
- GOLD, PHILIP J.; MD, 1991, UNIVERSITY OF MIAMI (FLORIDA); oncology
- GOPAL, AJAY; MD, 1993, EMORY UNIVERSITY; Med Oncology, Internal Med: Lymphoma, immunotherapy, radioimmunotherapy, therapy for older adults
- GOSS, CHRISTOPHER HOOPER; MD, 1992, UNIVERSITY OF COLORADO

Research Associate Professor

- CHEUNG, MARIAN C.; PhD, 1976, STATE UNIVERSITY OF NEW YORK (BUFFALO); metabolism and endocrinology.
- COOK, DAVID G.; PhD, 1991, YALE UNIVERSITY; molecular mechanisms of Alzheimers disease

- (DENVER); pulmonary and critical care medicine
- HALLSTRAND, TEAL; MD, 1993, UNIVERSITY OF WASHINGTON; MPH, 2000, UNIVERSITY OF WASHINGTON; Clinical and translational asthma research
- HING, ANNE V.; MD, 1985, WASHINGTON UNIVERSITY; Genetics and Craniofacial Development
- JOSEPHSON, NEIL C.; MD, 1988, COLUMBIA UNIVERSITY; Hematopoietic stem cell gene therapy and biology
- KO, CYNTHIA W.; MD, 1991, STANFORD UNIVERSITY; gastrointestinal epidemiology and health services research
- KUECHLE, MELANIE K.; MD, 1989, BAYLOR UNIVERSITY; dermatology
- LATCHMAN, YVETTE; PhD, 1996, UNIVERSITY COLLEGE, LONDON (UK); T cell activation and costimulation
- LEE, SCOTT D.; MD, 1994, JEFFERSON MEDICAL COLLEGE; Inflammatory Bowel Disease
- LINDEN, HANNAH M.; MD, 1989, UNIVERSITY OF MASSACHUSETTS; Breast Cancer, Neoadjuvant Therapy, Endocrine Therapy, Low Medical Literacy, Cytokines
- LINGAPPA, JAIRAM R.; PhD, 1987, HARVARD UNIVERSITY; The impact of genomics on public health response to infectious diseases
- LITTLE, TIMOTHY EUGENE; MD, 1983, UNIVERSITY OF SOUTHERN CALIFORNIA; gastroenterology.
- MALHOTRA, UMA; MD, 1986, ALL-INDIA INSTITUTE OF MEDICAL SCIENCES; Infectious Diseases and HIV-1 care; immunology of HIV-1 infection
- MCCLELLAND, RAYMOND SCOTT; MD, 1995, UNIVERSITY OF WASHINGTON; MPH, 2001, UNIVERSITY OF WASHINGTON; International HIV-1 and sexually transmitted disease epidemiology and clinical research
- MCNEELY, MARGUERITE J.; MD, 1988, UNIVERSITY OF WASHINGTON; MPH, 1993, UNIVERSITY OF WASHINGTON; general internal medicine
- MOONKA, RAVI; MD, 1990, UNIVERSITY OF PENNSYLVANIA; general surgery
- NEFF, MARGARET J.; MD, 1993, STANFORD UNIVERSITY; MSC, 2000, UNIVERSITY OF WASHINGTON; pulmonary and critical care medicine
- PHELAN, ELIZABETH A.; MD, 1992, TUFTS UNIVERSITY; MS, 1998, UNIVERSITY OF WASHINGTON; prevention of functional decline in older adults, how systems can support preservation of function
- PICKETT, CHERYL A.; PhD, 1984, UNIVERSITY OF CALIFORNIA (DAVIS); metabolism, endocrinology, nutrition
- RHIM, JONATHAN A.; MD, 1989, GEORGE WASHINGTON UNIVERSITY; molecular mechanisms of medical disease
- RHO, ROBERT W.; MD, 1992, LOMA LINDA UNIVERSITY; Cardiac resynchronization, Arrhythmia mechanisms, ablation-Atrial fibrillation & ventricular tachycardia
- RICHARD, ROBERT E.; PhD, 1992, STATE UNIV OF NEW YORK (STONY BROOK); gene and cell therapy for blood disorders
- SHADLEN, MARIE-FLORENCE; MD, 1983, BROWN UNIVERSITY; gerontology and geriatric medicine
- SINGH, NALINI; MD, 1995, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); diabetes care and diabetes complications
- STEMPIEN-OTERO, APRIL S.; MD, 1990, UNIVERSITY OF CONNECTICUT; cardiology
- WANG, CHIA C.; MD, 1990, NORTHWESTERN UNIVERSITY; MS, 1999, UNIVERSITY OF WASHINGTON; hepatitis C, hepatitis B, HIV
- WARREN, EDUS HOUSTON; PhD, 1988, HARVARD UNIVERSITY; oncology
- WISSE, BRENT; MD, 1995, MCGILL UNIVERSITY (CANADA); body weight regulation
- ZIVIN, ADAM H.; MD, 1991, OREGON HEALTH SCIENCES UNIVERSITY; cardiology
- Research Assistant Professor**
- WIJELATH, ERROL S.; PhD, 1989, UNIVERSITY OF STRATHCLYDE (UK); Extracellular matrix and growth factor interaction in vascular biology
- Microbiology**
- Professor**
- CHAMPOUX, JAMES J.; PhD, 1970, STANFORD UNIVERSITY; DNA replication, tumor virology
- CLARK, EDWARD A.; PhD, 1977, UNIVERSITY OF CALIFORNIA (LOS ANGELES); lymphocyte surface molecules, lymphocyte activation and cell communication
- COREY, LAWRENCE; MD, 1971, UNIVERSITY OF MICHIGAN; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus
- COYLE, MARIE B.; PhD, 1965, KANSAS STATE UNIVERSITY; DNA probes and GLC for rapid identification of mycobacteria and corynebacteria
- EMERMAN, MICHAEL; PhD, 1986, UNIVERSITY OF WISCONSIN; Molecular biology of the human immunodeficiency virus
- EVANS, CHARLES A.; PhD, 1943, UNIVERSITY OF MINNESOTA; microbial flora of human skin, medical virology
- FIELDS, STANLEY; PhD, 1981, CAMBRIDGE UNIVERSITY (UK); Yeast Molecular Biology and Genetics
- GEBALLE, ADAM PHILIP; MD, 1978, DUKE UNIVERSITY; translational regulation of viral and cellular gene expression
- GILLILAND, BRUCE C.; MD, 1960, NORTHWESTERN UNIVERSITY; hematology
- HAIGWOOD, NANCY L.; PhD, 1980, UNIVERSITY OF NORTH CAROLINA; host immunity in the control and prevention of AIDS
- HELLSTROM, KARL-ERIK; DrMed, 1964, UNIVERSITY OF STOCKHOLM (SWEDEN); oncology, cancer immunology, tumor biology
- HOLMES, KING K.; PhD, 1967, UNIVERSITY OF HAWAII; clinical epidemiology and pathogenesis of infectious diseases
- HU, SHIU-LOK; PhD, 1978, UNIVERSITY OF WISCONSIN; virus-host interactions, AIDS vaccines and pathogenesis of primate lentivirus infection
- KATZE, MICHAEL GERALD; PhD, 1980, HAHNEMANN MEDICAL COLLEGE; regulation of viral gene expression at the translational level
- LIDSTROM, MARY E.; PhD, 1977, UNIVERSITY OF WISCONSIN; biomolecular engineering, metabolic engineering, bioremediation
- LORY, STEPHEN; PhD, 1980, UNIVERSITY OF CALIFORNIA (LOS ANGELES); biochemistry, genetics of microbial virulence factors
- LUKEHART, SHEILA A.; PhD, 1978, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immunology of infectious diseases, microbiology, sexually transmitted diseases
- MILLER, SAMUEL I.; MD, 1979, BAYLOR UNIVERSITY; Salmonella pathogenesis and bacterial-eucaryotic cell interactions.
- MOSELEY, STEPHEN L.; PhD, 1981, UNIVERSITY OF WASHINGTON; molecular basis of pathogenesis in E. coli diarrhea.
- MULLINS, JAMES I.; PhD, 1978, UNIVERSITY OF MINNESOTA; retroviruses and AIDS, molecular virology
- NESTER, EUGENE W.; PhD, 1959, CASE WESTERN RESERVE UNIVERSITY; genetics and biochemistry, of bacterial-plant cell interactions
- OVERBAUGH, JULIE MAUREEN; PhD, 1983, UNIVERSITY OF COLORADO (BOULDER); molecular mechanisms of virus-host cell interactions/retroviral pathogenesis/aids
- RUBENS, CRAIG E.; PhD, 1978, MEDICAL UNIVERSITY OF SOUTH CAROLINA; infectious diseases/pathogenesis of gram(+) bacterial infections
- SHERRIS, JOHN C.; MBBS, 1948, UNIVERSITY OF LONDON (UK); MD, 1950, UNIVERSITY OF LONDON (UK); medical microbiology, antibiotic action and resistance
- STALEY, JAMES T.; PhD, 1967, UNIVERSITY OF CALIFORNIA (DAVIS); freshwater bacteriology, microbial ecology, general microbiology

STUART, KENNETH DANIEL; PhD, 1969, UNIVERSITY OF IOWA; molecular biology of parasites
TARR, PHILLIP I; MD, 1980, YALE UNIVERSITY; gastroenterology/infectious diseases
WHITE, THEODORE C; PhD, 1984, UNIVERSITY OF MICHIGAN; molecular mechanisms of virulence and drug resistance in pathogenic yeasts

Research Professor

DARVEAU, RICHARD P.; PhD, 1981, WASHINGTON STATE UNIVERSITY; innate host defense interactions between bacteria and their hosts
GALLOWAY, DENISE A; PhD, 1976, CITY UNIVERSITY OF NEW YORK; viral pathogenesis and neoplasia
LINIAL, MAXINE L; PhD, 1970, TUFTS UNIVERSITY; retroviral replication and genetics, retroviral transformation

Associate Professor

BUMGARNER, ROGER E.; PhD, 1988, UNIVERSITY OF ARIZONA; spectroscopy and instrumentation for biotechnology
COOKSON, BRAD T; PhD, 1991, WASHINGTON UNIVERSITY; cellular immune response to intracellular bacteria; microbial pathogenesis; clinical microbiology
HILL, WALTER E; PhD, 1972, UNIVERSITY OF WASHINGTON; genetic methods for detecting and characterizing foodborne microbial pathogens
LAMPE, MARY F; PhD, 1984, UNIVERSITY OF NORTH CAROLINA; medical technology education, molecular analysis of *Chlamydia trachomatis*
LARA, JIMMIE CANO; PhD, 1970, UNIVERSITY OF CALIFORNIA (RIVERSIDE); microbial physiology and cytology, sporulation and gas vesicle synthesis and regulation.
LEDBETTER, JEFFREY A.; PhD, 1978, UNIVERSITY OF WISCONSIN; oncology, immunology.
ROSE, TIMOTHY M; PhD, 1981, UNIVERSITY OF GENEVA (SWITZERLAND); molecular biology of tumor viruses, cell growth, differentiation, and transformation
TRAXLER, BETH A; PhD, 1987, CARNEGIE MELLON UNIVERSITY; bacterial physiology, genetics, and membrane protein biochemistry

Research Associate Professor

HERWIG, RUSSELL P; PhD, 1989, UNIVERSITY OF WASHINGTON; environmental and applied aquatic microbiology, bioremediation-related microbiology

Assistant Professor

LAW, CHE-LEUNG; PhD, 1990, UNIVERSITY OF MINNESOTA; immunology, B cell activation and development

MARR, KIEREN A; MD, 1993, HAHNEMANN MEDICAL COLLEGE; Fungal infections in immunocompromised hosts; Pathogenesis of aspergillosis
VAN T WOUT, ANGELIQUE B.; PhD, 1997, UNIVERSITY OF AMSTERDAM (NETHERLANDS); Interactions between HIV and its host cells
WOOD, DEREK WILLIAM; PhD, 1997, UNIVERSITY OF ARIZONA; genomic analysis and evolution of pathogenesis

Research Assistant Professor

INTERTHAL, HEIDRUN; PhD, 1996, UNIVERSITY OF BERNE (SWITZERLAND); DNA repair in eukaryotic cells

Lecturer

ANDERSON, DENISE G; MS, 1985, UNIVERSITY OF WASHINGTON; microbiology laboratory teaching
BARNES, GLOVER W; PhD, 1961, STATE UNIVERSITY OF NEW YORK (BUFFALO); tissue, organ immunology
BICKNELL, MARY; MS, 1962, UNIVERSITY OF WASHINGTON; microbiology laboratory teaching.
CHANDLER, MARK S; PhD, 1998, UNIVERSITY OF ILLINOIS; microbiology laboratory teaching
MEMMER, RAMONA; MS, 1957, UNIVERSITY OF WASHINGTON; microbiology laboratory teaching.
PARKHURST, DALE J.; BS, 1960, UNIVERSITY OF WASHINGTON; microbiology laboratory teaching.

Neurological Surgery

Professor

ANDERSON, GAIL; PhD, 1987, UNIVERSITY OF WASHINGTON; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma
CHAPMAN, JENS R.; MD, 1983, TECHNICAL UNIVERSITY OF MUNICH (GERMANY); orthopaedics, spine trauma/reconstruction
CHATRIAN, GIAN E; MD, 1951, UNIVERSITY OF NAPLES (ITALY); electroencephalography and clinical neurophysiology
COHEN, WENDY; MD, 1975, HARVARD UNIVERSITY; neuroradiology
DIKMAN, SUREYYA S; PhD, 1973, UNIVERSITY OF WASHINGTON; clinical neuropsychology, traumatic brain injury
DOMINO, KAREN B.; MA, 1974, UNIVERSITY OF NEW MEXICO; MD, 1978, UNIVERSITY OF MICHIGAN; neuroanesthesia.
ELLENBOGEN, RICHARD G.; BA, 1980, BROWN UNIVERSITY;

MD, 1983, BROWN UNIVERSITY; pediatric neurosurgery, neuro-oncology, complex spine
FRASER, ROBERT T; PhD, 1976, UNIVERSITY OF WISCONSIN; psychology.
GEYER, JEFFREY R.; MD, 1977, WAYNE STATE UNIVERSITY; hematology/oncology
GOODKIN, ROBERT; MD, 1964, CHICAGO MEDICAL SCHOOL; neurological surgery.
GRUSS, JOSEPH S.; MChB, 1969, UNIVERSITY OF WITWATERSRAND (S. AFRICA); craniofacial and maxillofacial surgery
HARRIS, A BASIL; MD, 1954, UNIVERSITY OF ALABAMA; neurosurgery, neuroanatomy, microvascular, arteriovenous malformations, epilepsy mechanisms
HAYNOR, DAVID R; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); medical image processing and segmentation; image deformation; functional MRI; expression arrays
JAFFE, KENNETH M; MD, 1975, HARVARD UNIVERSITY; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects
JARVIK, JEFFREY G; MD, 1987, UNIVERSITY OF CALIFORNIA (SAN DIEGO); neuroradiology, outcomes research
KELLY, WILLIAM A; MD, 1954, UNIVERSITY OF CINCINNATI; neurosurgery, neuroendocrinology
KLIOT, MICHEL; MD, 1984, YALE UNIVERSITY; peripheral nerve injury and diseases, nerve injury/regeneration
LAM, ARTHUR M; MD, 1974, WESTERN ONTARIO UNIVERSITY (CANADA); neuroanesthesia.
LARAMORE, GEORGE E; PhD, 1969, UNIVERSITY OF ILLINOIS; therapeutic radiology.
LEVY, RENE H; PhD, 1970, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); metabolic interactions among antiepileptic drugs and between cytokines and drugs
LOESER, JOHN D; MD, 1961, NEW YORK UNIVERSITY; pain, neurophysiology.
MARAVILLA, KENNETH R.; MD, 1970, STATE UNIVERSITY OF NEW YORK (BROOKLYN); neuroradiology and neurosurgery
MILLER, JOHN W.; PhD, 1981, UNIVERSITY OF ILLINOIS; epilepsy and clinical neurophysiology
MORRISON, RICHARD S; PhD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); genetic pathways regulating neuronal cell death in disease and injury
OJEMANN, GEORGE A; MD, 1959, UNIVERSITY OF IOWA; neurophysiology, organization of higher functions in brain, language, memory
PHILLIPS, MARK H; PhD, 1982, UNIVERSITY OF WISCONSIN; medical radiation physics
REH, THOMAS A.; PhD, 1981, UNIVERSITY OF WISCONSIN; regeneration and

development of central nervous system
 ROBERTS, THEODORE S.; MS, 1952, UNIVERSITY OF WISCONSIN; neurological surgery, stereotaxic surgery, pituitary and cerebrovascular disease
 ROBERTS, THEODORE S.; MD, 1955, UNIVERSITY OF WISCONSIN; neurological surgery, stereotaxic surgery, pituitary and cerebrovascular disease
 SILBERGELD, DANIEL L.; MD, 1984, UNIVERSITY OF CINCINNATI; brain tumors, epilepsy
 SPENCE, ALEXANDER M.; MD, 1965, UNIVERSITY OF CHICAGO; neurology, neuro-oncology.
 TEMKIN, NANCY R.; PhD, 1976, STATE UNIVERSITY OF NEW YORK (BUFFALO); clinical trials, recovery models, statistical modeling of epileptic phenomena, survival analysis.
 WEINBERGER, EDWARD; MD, 1979, HARVARD UNIVERSITY; pediatric radiology

Associate Professor

BECKER, KYRA J.; MD, 1989, DUKE UNIVERSITY; stroke, neurophysiology
 BELLABARBA, CARLO; MD, 1992, MCGILL UNIVERSITY (CANADA); spine trauma and reconstruction, orthopaedic trauma
 DALLEY, ROBERT W.; MD, 1982, UNIVERSITY OF UTAH; neuroradiology
 JANIGRO, DAMIR; PhD, 1982, UNIVERSITY OF MILAN (ITALY); blood brain barrier, glial-neuronal interactions
 MIRZA, SOHAIL K.; MD, 1989, UNIVERSITY OF COLORADO (DENVER); spinal surgery/spine biomechanics
 NELSON, PETER S.; MD, 1986, UNIVERSITY OF KANSAS; the study of human carcinogenesis using tools of genomics and bioinformatics
 OJEMANN, JEFFREY G.; MA, 1992, WASHINGTON UNIVERSITY; MD, 1992, WASHINGTON UNIVERSITY; fMRI and electrical studies of cognition in neurosurgery, epilepsy imaging, brain-computer interface
 OJEMANN, LINDA M.; MD, 1960, UNIVERSITY OF ILLINOIS; neurology, treatment of epilepsy.
 ROSTOMILY, ROBERT C.; MD, 1987, CASE WESTERN RESERVE UNIVERSITY; surgery of adult brain and cranial base tumors, molecular biology of nervous system tremors
 VAVILALA, MONICA S.; MD, 1991, UNIVERSITY OF TEXAS (HOUSTON); pediatric pain management
 WILENSKY, ALAN J.; PhD, 1973, UNIVERSITY OF TORONTO (CANADA); neurology, treatment of epilepsy, testing and use of anticonvulsants

Research Associate Professor

MOURAD, PIERRE; PhD, 1987, UNIVERSITY OF WASHINGTON; translational research in diagnostic and therapeutic ultrasound

SILBER, JOHN R.; PhD, 1977, UNIVERSITY OF FLORIDA; neuro-oncology

Assistant Professor

AVELLINO, ANTHONY M.; MD, 1992, COLUMBIA UNIVERSITY; Pediatric Neurosurgery
 BRANSFORD, RICHARD; MD, 1996, VANDERBILT UNIVERSITY; Pediatric, Degenerative, & Traumatic Spine Conditions, Pediatric Orthopaedics, 3rd World Medicine
 BRITZ, GAVIN W.; MBBChir, 1987, UNIVERSITY OF WITWATERSRAND (S. AFRICA); Cerebral aneurysms and AVMs, Carotid disease, skull base tumors, cerebral vasospasm

Neurology

Professor

BIRD, THOMAS D.; MD, 1968, CORNELL UNIVERSITY; neurology, neurogenetics
 CHAMBERLAIN, JEFFREY S.; PhD, 1985, UNIVERSITY OF WASHINGTON; neurogenetics, Duchennes muscular dystrophy
 CHANCE, PHILLIP F.; MD, 1978, UNIVERSITY OF TENNESSEE; pediatric neurology and genetics
 COPASS, MICHAEL K.; MA, 1964, NORTHWESTERN UNIVERSITY; MD, 1964, NORTHWESTERN UNIVERSITY; neurology/emergency services
 CRILL, WAYNE E.; MD, 1962, UNIVERSITY OF WASHINGTON; properties of spinal and cortical neurons, mechanisms of repetitive firing of CNS neurons
 DODRILL, CARL B.; PhD, 1970, PURDUE UNIVERSITY; neurophysiology of epilepsy
 FARRELL, DONALD; MD, 1965, GEORGE WASHINGTON UNIVERSITY; neurology, clinical neurophysiology including intraoperative monitoring, evoked potentials
 FRASER, ROBERT T.; PhD, 1976, UNIVERSITY OF WISCONSIN; psychology.
 GOSPE, SIDNEY M.; PhD, 1980, DUKE UNIVERSITY; pyridoxine-dependent seizures, developmental neurotoxicity of second-hand tobacco smoke and toluene
 KRAFT, GEORGE HOWARD; MD, 1963, OHIO STATE UNIVERSITY; psychiatry
 LONGSTRETH JR, W. T.; MD, 1975, UNIVERSITY OF PENNSYLVANIA; MPH, 1982, UNIVERSITY OF WASHINGTON; neurology
 MARRA, CHRISTINA M.; MS, 1979, OREGON STATE UNIVERSITY; MD, 1984, UNIVERSITY OF OREGON; neurology, infectious diseases.
 MILLER, JOHN W.; PhD, 1981, UNIVERSITY OF ILLINOIS; epilepsy and clinical neurophysiology

RANSOM, BRUCE ROBERT; PhD, 1972, WASHINGTON UNIVERSITY; neurology, neuroscience research
 SHADLEN, MICHAEL N.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); neurobiology of vision and cognition
 SPAIN, WILLIAM; MD, 1977, COLUMBIA UNIVERSITY; signal transduction in the central nervous system
 SPENCE, ALEXANDER M.; MD, 1965, UNIVERSITY OF CHICAGO; neurology, neuro-oncology.
 STAHL, WILLIAM L.; PhD, 1963, UNIVERSITY OF PITTSBURGH; neurochemistry of brain ATPase systems.
 SUMI, SHUZO MARK; MD, 1956, UNIVERSITY OF TORONTO (CANADA); neuropathology, neuromuscular disease, neurodegenerative diseases
 SWANSON, PHILLIP D.; PhD, 1964, UNIVERSITY OF LONDON (UK); movement disorders, neurology
 TAPSCOTT, STEPHEN J.; PhD, 1982, UNIVERSITY OF PENNSYLVANIA; molecular and developmental biology
 WILENSKY, ALAN J.; PhD, 1973, UNIVERSITY OF TORONTO (CANADA); neurology, treatment of epilepsy, testing and use of anticonvulsants

Research Professor

FRANKLIN, GARY M.; MD, 1969, GEORGE WASHINGTON UNIVERSITY; MPH, 1982, UNIVERSITY OF CALIFORNIA (BERKELEY); occupational injury, neurological epidemiology, public health nutrition
 SCHELLENBERG, GERARD D.; PhD, 1978, UNIVERSITY OF CALIFORNIA (RIVERSIDE); mapping of familial Alzheimer disease genes and cloning of Werner's syndrome gene

Associate Professor

BECKER, KYRA J.; MD, 1989, DUKE UNIVERSITY; stroke, neurophysiology
 GARDEN, GWENN A.; PhD, 1994, UNIVERSITY OF WASHINGTON; Caspase enzymes and apoptosis in HIV neural injury
 HOLMES, MARK D.; MD, 1977, OHIO STATE UNIVERSITY; neurology/EEG.
 KAPUR, VISHESH; MD, 1989, YALE UNIVERSITY; pulmonary and critical-care medicine
 KRAUS, ERIC E.; MD, 1991, UNIVERSITY OF MINNESOTA; general neurology
 KURATANI, JOHN D.; MD, 1990, TULANE UNIVERSITY; pediatric epilepsy, EEG
 LEVERENZ, JAMES B.; MD, 1985, UNIVERSITY OF WASHINGTON; neurology, psychiatry and behavioral sciences, Alzheimer's
 MILSTEIN, JERROLD M.; MD, 1964, UNIVERSITY OF MINNESOTA; pediatric neurology
 SOTERO DE MENEZES, MARCIO; MD, 1984, RIO DE JANEIRO ST. U. MED.

SCH. (BRAZIL); pediatric neurology, epilepsy, EEG
TIRSCHWELL, DAVID L.; MD, 1991, CORNELL UNIVERSITY; neurology, stroke
YANG, CLAIRE C.; MD, 1988, VANDERBILT UNIVERSITY; neurourology and electrophysiology testing
ZUNT, JOSEPH R.; MD, 1991, UNIVERSITY OF MINNESOTA; MPH, 1998, UNIVERSITY OF WASHINGTON; infectious disease, neuroepidemiology of AIDS/HIV

Research Associate Professor

MOELLER, THOMAS; PhD, 1996, FREIE UNIVERSITY OF BERLIN (GERMANY); neurophysiology

Assistant Professor

BROWN, ANGUS M.; PhD, 1990, UNIVERSITY OF MANCHESTER (UK); neuroscience research
CRAMER, STEVEN C.; MD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; MMSc, 1997, HARVARD UNIVERSITY; stroke, sensorimotor human brain mapping, in healthy and diseased subjects
DISTAD, B. JANE; MD, 1994, MEDICAL COLLEGE OF OHIO; General neurology, neuromuscular disease and electromyography
FERN, ROBERT; PhD, 1992, UNIVERSITY COLLEGE, LONDON (UK); cellular mechanisms of ischemic neonatal brain injury (cerebral palsy)
MEEKINS, GREGG D.; MD, 1993, TULANE UNIVERSITY; clinical neurophysiology, EMG
PINTER, JOSEPH D.; MD, 1990, UNIVERSITY OF CALIFORNIA (LOS ANGELES); pediatric neurology
WARNER, MARY H.; PhD, 0, UNIVERSITY OF GEORGIA; neuropsychology
WATSON, NATHANIEL F.; MD, 1996, UNIVERSITY OF NORTH CAROLINA; Clinical sleep disorders, general neurology.
WEISS, MICHAEL D.; MD, 1991, ALBERT EINSTEIN COLLEGE OF MEDICINE; EMG, EEG, neuropathology and neuromuscular disorders
YUEN, ERIC C.; MD, 1989, UNIVERSITY OF CHICAGO; EMG, peripheral neuropathy

Obstetrics and Gynecology

Professor

BENEDETTI, THOMAS J.; MD, 1973, UNIVERSITY OF WASHINGTON; perinatal medicine.

BREMNER, WILLIAM J.; PhD, 1977, MONASH UNIVERSITY (AUSTRALIA); endocrinology
BROWN, ZANE A.; MD, 1966, TEMPLE UNIVERSITY; insulin requiring diabetes complicating pregnancy, genital herpes complicating pregnancy.
CLIFTON, DONALD K.; PhD, 1979, UNIVERSITY OF CALIFORNIA (LOS ANGELES); reproductive physiology.
DISIS, MARY L.; MS, 1986, UNIVERSITY OF NEBRASKA; MD, 1986, UNIVERSITY OF NEBRASKA; oncology
EASTERLING, THOMAS R.; MD, 1981, UNIVERSITY OF NORTH CAROLINA; perinatal medicine, hypertension during pregnancy
ESCHENBACH, DAVID A.; MD, 1968, UNIVERSITY OF WISCONSIN; gynecology and infectious disease.
GOFF, BARBARA A.; MD, 1986, UNIVERSITY OF PENNSYLVANIA; gynecologic oncology
GREER, BENJAMIN E.; MD, 1966, UNIVERSITY OF PENNSYLVANIA; gynecologic oncology.
HEBERT, MARY F.; PharmD, 1987, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); transplantation, immunology pharmacotherapeutics
HICKOK, DURLIN E.; MD, 1973, UNIVERSITY OF MICHIGAN; perinatal epidemiology
KNOPP, ROBERT H.; MD, 1964, CORNELL UNIVERSITY; metabolism and endocrinology
KOH, WUI-JIN; MD, 1984, LOMA LINDA UNIVERSITY; therapeutic radiology.
LEIN, JOHN N.; MD, 1955, UNIVERSITY OF WASHINGTON; government relations.
MERRIAM, GEORGE R.; MD, 1976, HARVARD UNIVERSITY; metabolism and endocrinology.
PATTON, DOROTHY L.; PhD, 1981, UNIVERSITY OF WASHINGTON; infectious disease
SHIELDS, LAURENCE E.; MD, 1987, UNIVERSITY OF TEXAS (SAN ANTONIO); perinatal medicine
SHY, KIRKWOOD K.; MD, 1973, WAYNE STATE UNIVERSITY; epidemiologic applications to problems in obstetrics and gynecology
SOULES, MICHAEL R.; MD, 1972, UNIVERSITY OF CALIFORNIA (LOS ANGELES); reproductive endocrinology.
SPADONI, LEON R.; MD, 1957, UNIVERSITY OF WASHINGTON; reproductive endocrinology.
STEINER, ROBERT A.; PhD, 1975, UNIVERSITY OF OREGON; neuroendocrinology, neuroscience, endocrinology
STENCHEVER, MORTON A.; MD, 1956, STATE UNIVERSITY OF NEW YORK (BUFFALO); gynecology, reproductive genetics, medical education.
TAMIMI, HISHAM K.; MD, 1969, CAIRO UNIVERSITY (EGYPT); gynecologic oncology.

VONTVER, LOUIS A.; MD, 1960, UNIVERSITY OF MINNESOTA; MED, 1970, UNIVERSITY OF WASHINGTON; medical education, gynecology
WALKER, EDWARD A.; MD, 1983, UNIVERSITY OF WASHINGTON; consultation-liaison psychiatry, medically unexplained physical symptoms

Associate Professor

CHENG, EDITH Y.; MS, 1979, SARAH LAWRENCE COLLEGE; MD, 1987, UNIVERSITY OF WASHINGTON; genetics, perinatal medicine
ECKERT, LINDA O.; MD, 1987, UNIVERSITY OF CALIFORNIA (SAN DIEGO); gynecology.
HITTI, JANE; MD, 1989, UNIVERSITY OF VERMONT; MPH, 1995, UNIVERSITY OF WASHINGTON; perinatal medicine, HIV and pregnancy
LENTZ, GRETCHEN M.; MD, 1986, UNIVERSITY OF WASHINGTON; urogynecology
MILLER WEERTMAN, LESLIE; MD, 1990, UNIVERSITY OF WASHINGTON; contraception, reproductive endocrinology, sexually transmitted disease
MOORE, DONALD E.; MD, 1967, CASE WESTERN RESERVE UNIVERSITY; reproductive endocrinology.
REED, SUSAN D.; MS, 1979, SARAH LAWRENCE COLLEGE; MD, 1986, STANFORD UNIVERSITY; gynecology, evidence-based medicine and clinical outcomes studies, hormone replacement therapy

Assistant Professor

CARR, DARCY R.; MD, 1993, MEDICAL COLLEGE OF WISCONSIN; Diabetes and heart disease risk factors in women with prior preeclampsia or gestational diabetes
GARCIA, ROCHELLE; MD, 1989, UNIVERSITY OF WASHINGTON; cytology, gynecologic pathology
KLINE, CAROLYN R.; MA, 1984, HARVARD UNIVERSITY; MD, 1990, STANFORD UNIVERSITY; perinatal medicine
MAO, CONSTANCE; MD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; Screening and prevention of cervical cancer, human papilloma virus infection
MELVILLE, JENNIFER L.; MD, 1995, UNIVERSITY OF CALIFORNIA (LOS ANGELES); MPH, 2001, UNIVERSITY OF WASHINGTON; Depression in Obstetrics and Gynecology
MELVILLE, JENNIFER L.; BA, 1991, UNIVERSITY OF TEXAS (AUSTIN); Depression in Obstetrics and Gynecology
PALEY, PAMELA J.; MD, 1990, LOYOLA UNIVERSITY (CHICAGO); gynecologic oncology
SWENSEN, RON E.; MD, 1984, LOMA LINDA UNIVERSITY; Gynecologic Oncology clinical trials

Ophthalmology

Professor

- CLARK, JOHN I.; PhD, 1974, UNIVERSITY OF WASHINGTON; biophysical and structural properties of cytoplasmic proteins, cell aging, differentiation
- KALINA, ROBERT E.; MD, 1960, UNIVERSITY OF MINNESOTA; vitreoretinal diseases.
- KINYOUN, JAMES L.; MD, 1971, UNIVERSITY OF NEBRASKA; vitreoretinal diseases.
- MILAM, ANN H.; PhD, 1967, UNIVERSITY OF TEXAS (SOUTHWESTERN); electron microscopy, ophthalmic pathology, retinitis pigmentosa, retinal cell biology
- ORCUTT, JAMES C.; PhD, 1976, UNIVERSITY OF COLORADO (DENVER); orbit, oculoplastics, neuro-ophthalmology
- PAGON, ROBERTA A.; MD, 1972, HARVARD UNIVERSITY; medical genetics
- PALCZEWSKI, KRZYSZTOF; PhD, 1986, TECHNICAL UNIVERSITY OF WROCLAW (POLAND); visual transduction.
- PATTON, DOROTHY L.; PhD, 1981, UNIVERSITY OF WASHINGTON; infectious disease
- REH, THOMAS A.; PhD, 1981, UNIVERSITY OF WISCONSIN; regeneration and development of central nervous system
- SAARI, JOHN C.; PhD, 1970, UNIVERSITY OF WASHINGTON; retinal biochemistry
- WEISS, AVERY H.; MD, 1974, MIAMI UNIVERSITY (OHIO); pediatric ophthalmology, strabismus

Associate Professor

- CHEN, PHILIP P.; MD, 1991, YALE UNIVERSITY; glaucoma
- CHUANG, ELAINE L.; MD, 1979, UNIVERSITY OF TEXAS (SAN ANTONIO); vitreoretinal diseases, ocular inflammation
- RIEKE, FREDERICK MARTIN; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); sensory signal processing and computation
- SAPERSTEIN, DAVID A.; MD, 1987, PENNSYLVANIA STATE UNIVERSITY; vitreoretinal diseases, macular degeneration
- SIRES, BRYAN S.; PhD, 1986, NORTHWESTERN UNIVERSITY; plastic and reconstructive surgery

Assistant Professor

- SHEN, TUENG T.; PhD, 1994, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; Refractive & advanced eye surgery techniques, Corneal tissue research, tissue donation awareness

Orthopaedics

Professor

- BENIRSCHKE, STEPHEN K.; MD, 1979, CASE WESTERN RESERVE UNIVERSITY; traumatology
- BERRYMAN, JACK W.; PhD, 1976, UNIVERSITY OF MARYLAND; history of exercise, sports medicine, and health behavior/philosophy
- BIGOS, STANLEY J.; MD, 1975, UNIVERSITY OF MISSOURI; orthopaedics, spine
- CHANSKY, HOWARD ALAN; MD, 1987, UNIVERSITY OF PENNSYLVANIA; orthopaedics, general
- CHAPMAN, JENS R.; MD, 1983, TECHNICAL UNIVERSITY OF MUNICH (GERMANY); orthopaedics, spine trauma/reconstruction
- CHESNUT, CHARLES; MD, 1966, UNIVERSITY OF FLORIDA; nuclear medicine
- CONRAD, ERNEST U.; MD, 1979, UNIVERSITY OF VIRGINIA; orthopaedics, tumors and bone transplantation
- DEYO, RICHARD A.; MD, 1975, PENNSYLVANIA STATE UNIVERSITY; health status measurement and evaluation of common medical practices
- EARY, JANET F.; MD, 1980, MICHIGAN STATE UNIVERSITY; nuclear medicine
- EYRE, DAVID R.; PhD, 1969, UNIVERSITY OF LEEDS (UK); connective tissue biology, collagen chemistry, bone and cartilage metabolism
- GARDNER, GREGORY C.; MD, 1984, BAYLOR UNIVERSITY; rheumatology
- GRANEY, DANIEL O.; PhD, 1965, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); gross anatomy, electron microscopy, intestinal absorption
- HANEL, DOUGLAS PAUL; MD, 1977, ST LOUIS UNIVERSITY; orthopaedics, hand/microvascular surgery
- HANSEN, SIGVARD T.; MD, 1961, UNIVERSITY OF WASHINGTON; orthopaedics, foot, ankle and amputations
- HENLEY, MICHAEL BRADFORD; MD, 1979, UNIVERSITY OF WASHINGTON; orthopaedics, trauma, post-traumatic reconstruction, spinal trauma
- MANN, FREDERICK A.; MD, 1975, INDIANA UNIVERSITY; emergency and trauma radiology
- MATSEN, FREDERICK A.; MD, 1968, BAYLOR UNIVERSITY; orthopaedics, bone and joint research, robotics
- MILLS, WILLIAM J.; MD, 1950, STANFORD UNIVERSITY; traumatology, knee ligament injury
- MIRZA, SOHAIL K.; MD, 1989, UNIVERSITY OF COLORADO (DENVER); spinal surgery/spine biomechanics
- OLERUD, JOHN E.; MD, 1971, UNIVERSITY OF WASHINGTON; dermatology

- RASKIND, WENDY H.; PhD, 1977, UNIVERSITY OF WASHINGTON; medical genetics.
- RICHARDSON, MICHAEL L.; MD, 1975, BAYLOR UNIVERSITY; bone and joint radiology and musculoskeletal radiology
- ROUTT, MILTON L.; MD, 1983, UNIVERSITY OF TEXAS (GALVESTON); orthopaedics, traumatology
- SANGEORZAN, BRUCE J.; MD, 1981, WAYNE STATE UNIVERSITY; orthopaedics, trauma, and foot and ankle deformity
- SIDLES, JOHN ARTHUR; PhD, 1983, UNIVERSITY OF WASHINGTON; seeing molecules (i.e., quantum-coherent instrumentation); regenerating cartilage
- SIMKIN, PETER A.; MD, 1961, UNIVERSITY OF PENNSYLVANIA; rheumatology.
- SMITH, DOUGLAS G.; MD, 1984, UNIVERSITY OF CHICAGO; orthopaedics, traumatology, foot, ankle, amputations
- SMITH, NATHAN J.; MD, 1945, UNIVERSITY OF WISCONSIN; sports medicine
- STAHELI, LYNN T.; MD, 1959, UNIVERSITY OF UTAH; pediatric orthopaedics
- TEITZ, CAROL CLAIRE; MD, 1974, YALE UNIVERSITY; orthopaedics, arthroscopy, sports medicine
- TENCER, ALLAN FRED; PhD, 1981, MCGILL UNIVERSITY (CANADA); biomechanics of joints, orthopaedic trauma implants
- TRUMBLE, THOMAS E.; MD, 1979, YALE UNIVERSITY; orthopaedics, hand and microvascular surgery
- VEDDER, NICHOLAS; MD, 1981, CASE WESTERN RESERVE UNIVERSITY; case history, plastic and reconstructive surgery.
- WILSON, ANTHONY J.; MBBChir, 1972, OTAGO UNIVERSITY (NEW ZEALAND); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT

Associate Professor

- ALLAN, CHRISTOPHER H.; MD, 1992, NORTHWESTERN UNIVERSITY; hand and microvascular surgery
- BELLABARBA, CARLO; MD, 1992, MCGILL UNIVERSITY (CANADA); spine trauma and reconstruction, orthopaedic trauma
- GILLESPIE, THURMAN; MD, 1980, THOMAS JEFFERSON UNIVERSITY; musculoskeletal radiology, orthopaedics
- GREENLEE, THEODORE K.; MD, 1959, NORTHWESTERN UNIVERSITY; general orthopaedics.
- GROSS, TED S.; PhD, 1993, STATE UNIV OF NEW YORK (STONY BROOK); biomechanics
- KADEL, NANCY J.; MD, 1988, UNIVERSITY OF WASHINGTON; orthopedic surgery, foot/ankle
- LARSON, ROGER V.; MD, 1973, UNIVERSITY OF UTAH; orthopaedics,

anthroscopy, sports medicine and knee ligament reconstruction
 LEOPOLD, SETH S.; MD, 1993, CORNELL UNIVERSITY; Treatments for hip and knee arthritis, arthritis research, and joint replacement surgery
 MILLS, WILLIAM J.; MS, 1985, UNIVERSITY OF MINNESOTA; MD, 1989, UNIVERSITY OF COLORADO (DENVER); traumatology, knee ligament injury
 MOSCA, VINCENT S.; MD, 1978, UNIVERSITY OF ROCHESTER; pediatric orthopaedics, the child's foot, limb length discrepancies
 NORK, SEAN E.; MD, 1992, UNIVERSITY OF CALIFORNIA (SAN DIEGO); traumatology
 O'KANE, JOHN; MD, 1993, UNIVERSITY OF VERMONT; family medicine, sports medicine, team care
 OTT, SUSAN M.; MD, 1974, UNIVERSITY OF WASHINGTON; nephrology
 SIMONIAN, PETER TODD; MD, 1991, UNIVERSITY OF SOUTHERN CALIFORNIA; orthopaedics, general, sports medicine
 SMITH, KEVIN L.; MD, 1990, SOUTHERN ILLINOIS UNIVERSITY; shoulder and elbow orthopaedics
 SONG, KIT M.; MD, 1985, UNIVERSITY OF IOWA; pediatric orthopaedics, spinal deformities of children
 ZHANG, MIQIN; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Biomaterials, tissue engineering, BioMEMS, bionanotechnology, surface modification, drug delivery.

Research Associate Professor

CHING, RANDAL PRESTON; PhD, 1992, UNIVERSITY OF WASHINGTON; orthopaedic biomechanisms related to injury prevention, injury mechanisms and injury repair
 WU, JIANN-JIU; PhD, 1978, TEXAS A&M UNIVERSITY; orthopaedics.

Assistant Professor

AVELLINO, ANTHONY M.; MD, 1992, COLUMBIA UNIVERSITY; Pediatric Neurosurgery
 BAREI, DAVID P.; MD, 1991, UNIVERSITY OF OTTAWA (CANADA); traumatology
 BRANSFORD, RICHARD; MD, 1996, VANDERBILT UNIVERSITY; Pediatric, Degenerative, & Traumatic Spine Conditions, Pediatric Orthopaedics, 3rd World Medicine
 DALES, MARK C.; MD, 1982, UNIVERSITY OF NEVADA; orthopaedics.
 TAITSMAN, LISA A.; MD, 1994, BROWN UNIVERSITY; MPH, 1995, HARVARD UNIVERSITY; Orthopaedic trauma

Otolaryngology—Head and Neck Surgery

Professor

COLTRERA, MARC DANTE; MD, 1981, YALE UNIVERSITY; otolaryngology/head and neck surgery
 DONALDSON, JAMES A.; MD, 1954, UNIVERSITY OF MINNESOTA; otology
 DUCKERT, LARRY GENE; PhD, 1977, UNIVERSITY OF MINNESOTA; otology/neurotology
 FUCHS, ALBERT F.; PhD, 1966, JOHNS HOPKINS UNIVERSITY; oculomotor physiology, vision
 FUTRAN, NEAL DAVID; DMD, 1982, UNIVERSITY OF PENNSYLVANIA; MD, 1987, ST UNIV OF NEW YORK (DOWNSTATE MED CTR); oral maxillofacial surgery
 GATES, GEORGE A.; MD, 1959, UNIVERSITY OF MICHIGAN; otology/neurotology, cochlear implantation
 HILLEL, ALLEN D.; MD, 1976, STANFORD UNIVERSITY; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease
 KUHL, PATRICIA K.; PhD, 1973, UNIVERSITY OF MINNESOTA; speech perception.
 MANNING, SCOTT C.; MD, 1980, TULANE UNIVERSITY; pediatric otolaryngology/head and neck surgery
 NORTON, SUSAN J.; PhD, 1982, UNIVERSITY OF WASHINGTON; normal and non-normal hearing, specifically cochlear mechanics, in humans and animals
 ORCUTT, JAMES C.; PhD, 1976, UNIVERSITY OF COLORADO (DENVER); orbit, oculoplastics, neuro-ophthalmology
 ROBINSON, LAWRENCE R.; MD, 1982, BAYLOR UNIVERSITY; physiatry
 RUBEL, EDWIN W.; PhD, 1969, MICHIGAN STATE UNIVERSITY; developmental neurobiology, with special emphasis on vertebrate auditory system development
 SCHUBERT, MARK M.; DDS, 1974, UNIVERSITY OF WASHINGTON; MSD, 1981, UNIVERSITY OF WASHINGTON; oral medicine/oral oncology
 SNYDER, JACK; PhD, 1971, UNIVERSITY OF WASHINGTON; audiology.
 STANLEY, ROBERT B.; MD, 1976, DUKE UNIVERSITY; otolaryngology/head and neck surgery, trauma, maxillofacial surgery
 TEMPEL, BRUCE L.; PhD, 1983, PRINCETON UNIVERSITY; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function
 WERNER, LYNNE A.; PhD, 1980, LOYOLA UNIVERSITY (CHICAGO); auditory development, infant psychoacoustics
 WEYMULLER, ERNEST A.; MD, 1966, HARVARD UNIVERSITY; otolaryngology/head and neck surgery

Associate Professor

CALDERON, ROSEMARY; PhD, 1988, UNIVERSITY OF WASHINGTON; mental health and deafness, childhood psychopathology, early intervention
 FEENEY, M. PATRICK; PhD, 1993, UNIVERSITY OF WASHINGTON; The aging auditory system and wideband assessment of middle-ear function
 GLENN, MICHAEL GERARD; MD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); otolaryngology/head and neck surgery, microvascular surgery
 INGLIS, ANDREW F.; MD, 1981, MEDICAL COLLEGE OF PENNSYLVANIA; pediatric otolaryngology/head and neck surgery
 LIPPE, WILLIAM R.; PhD, 1972, UNIVERSITY OF CALIFORNIA (IRVINE); neurobiology
 MAKIELSKI, KATHLEEN H.; MD, 1978, UNIVERSITY OF MICHIGAN; otolaryngology/head and neck surgery
 MILLER, ROBERT M.; PhD, 1976, UNIVERSITY OF WASHINGTON; speech, language pathology, adults, swallowing
 MURAKAMI, CRAIG S.; MD, 1983, UNIVERSITY OF WASHINGTON; facial cosmetic and reconstructive surgery
 PERKINS, JONATHAN A.; DO, 0, OSTEOPATHIC MEDICINE AND SURGERY (IOWA); pediatric otolaryngology head and neck surgery
 PINCZOWER, ERIC F.; MD, 1986, UNIVERSITY OF CALIFORNIA (IRVINE); otolaryngology/head and neck surgery, facial reconstructive surgery.
 REES, THOMAS; PhD, 1972, UNIVERSITY OF WASHINGTON; audiology.
 SIE, KATHLEEN C.Y.; MD, 1984, UNIVERSITY OF MICHIGAN; pediatric otolaryngology/head and neck surgery
 YUEH, BEVAN; MD, 1989, STANFORD UNIVERSITY; clinical epidemiology of hearing loss and head and neck cancer

Research Associate Professor

OESTERLE, ELIZABETH C.; PhD, 1987, PURDUE UNIVERSITY; hair cell regeneration and supporting-cell functioning
 PHILLIPS, JAMES O.; PhD, 1993, UNIVERSITY OF WASHINGTON; vestibular neurobiology, neuronal control of eye and head movements during gaze shifts in primates

Assistant Professor

HUME, CLIFFORD; PhD, 1988, CORNELL UNIVERSITY; Otolaryngology, cochlear implantation, inner ear embryology and gene therapy
 MOST, SAM P.; MD, 1995, STANFORD UNIVERSITY; Facial plastic and reconstructive surgery
 WHIPPLE, MARK E.; MD, 1991, UNIVERSITY OF WASHINGTON; MS, 2001, MASSACHUSETTS INSTITUTE OF

TECHNOLOGY; Bioinformatics for gene expression

Pathology

Professor

- ALPERS, CHARLES E.; MD, 1978, UNIVERSITY OF ROCHESTER; clinical/experimental glomerular disease, AIDS in man and experimental simian AIDS, vascular biology
- ALVORD, ELLSWORTH C; MD, 1946, CORNELL UNIVERSITY; neuropathology, experimental allergic encephalitis
- ARGENYI, ZSOLT B; MD, 1978, SEMMELWEIS MEDICAL UNIVERSITY (HUNGARY); dermatopathology
- BOWEN-POPE, DANIEL; PhD, 1979, UNIVERSITY OF CALIFORNIA (BERKELEY); gene regulation, growth factors and receptors
- BYERS, PETER H; MD, 1969, CASE WESTERN RESERVE UNIVERSITY; extracellular matrix synthesis, genetic disorders of collagen metabolism, secretion, human genetics
- CLOWES, ALEXANDER W; MD, 1972, HARVARD UNIVERSITY; vascular smooth muscle cell growth control arterial injury and repair
- COLLINS, STEVEN J; MD, 1973, COLUMBIA UNIVERSITY; retinoic acid receptors and the pathogenesis of malignancy
- DISIS, MARY L.; MS, 1986, UNIVERSITY OF NEBRASKA; MD, 1986, UNIVERSITY OF NEBRASKA; oncology
- DISTECHE, CHRISTINE M; PhD, 1976, UNIVERSITY OF LIEGE (BELGIUM); molecular genetics of sex chromosomes, X inactivation, human and mouse cytogenetics
- EARY, JANET F; MD, 1980, MICHIGAN STATE UNIVERSITY; nuclear medicine
- EISEN, HARVEY; PhD, 1967, UNIVERSITY OF TORONTO (CANADA); host-parasite interactions, generation of genetic diversity
- FAUSTO, NELSON; MD, 1960, SAO PAULO STATE UNIVERSITY (BRAZIL); liver regeneration, tumor biology, carcinogenesis, growth factors
- FRIEND, STEPHEN H; PhD, 1979, INDIANA UNIVERSITY; molecular biology of embryonal tumor, molecular pharmacology, tumor suppressor genes
- GIACHELLI, CECILIA; PhD, 1987, UNIVERSITY OF WASHINGTON; adhesion molecules and vascular biology processes
- GROUDINE, MARK; PhD, 1976, UNIVERSITY OF PENNSYLVANIA; chromatin structure and gene activity
- GUGGENHEIM, STEPHEN J.; MD, 1964, HARVARD UNIVERSITY; microbiology, renal pathology
- HARLAN, JOHN M.; MD, 1973, UNIVERSITY OF CHICAGO; vascular biology with emphasis on leukocyte-endothelial adhesion
- HELLSTROM, KARL-ERIK; DrMed, 1964, UNIVERSITY OF STOCKHOLM (SWEDEN); DrMed, 1966, KAROLINSKA INSTITUTE (SWEDEN); tumor immunology
- HORWITZ, MARSHALL S; PhD, 1988, UNIVERSITY OF WASHINGTON; inherited white blood cell disorders, including leukemia
- KEMP, CHRISTOPHER JAMES; PhD, 1989, UNIVERSITY OF WISCONSIN; genetic and environmental influence on multistage cancer in the mouse
- KIVIAT, NANCY C; MA, 1970, UNIVERSITY OF WASHINGTON; MD, 1975, UNIVERSITY OF WASHINGTON; epidemiologic and molecular biologic studies of the relationship between HPV, HIV, and neoplasia
- LOEB, LAWRENCE A; PhD, 1967, UNIVERSITY OF CALIFORNIA (BERKELEY); DNA replication, cancer and AIDS
- MARTIN, GEORGE; MD, 1953, UNIVERSITY OF WASHINGTON; somatic cell genetics, pathobiology of aging, neurodegenerative disorders
- MILLER, ARTHUR D.; PhD, 1982, STANFORD UNIVERSITY; virology, gene therapy
- MONNAT, RAYMOND J; MD, 1976, UNIVERSITY OF CHICAGO; somatic mutation, somatic cell molecular genetics, human genetic disease
- MONTINE, THOMAS J; PhD, 1988, UNIVERSITY OF ROCHESTER; age-related neurodegeneration, Alzheimer's disease, Parkinson's disease,
- MOTTET, N KARLE; MD, 1952, YALE UNIVERSITY; effects of trace elements, especially methylmercury and arsenic, on growth and development.
- MURRY, CHARLES E.; PhD, 1989, DUKE UNIVERSITY; myocardial infarction, heart regeneration, skeletal/cardiac muscle differentiation
- NARAYANAN, A SAMPATH; PhD, 1967, UNIVERSITY OF MADRAS (INDIA); connective tissue, periodontal disease, regulation of fibroblast growth, matrix synthesis
- NICOSIA, ROBERTO F; PhD, 1984, MEDICAL COLLEGE OF PENNSYLVANIA; vascular and renal pathology
- NORWOOD, THOMAS H; MD, 1968, UNIVERSITY OF MARYLAND; somatic cell genetics, pathobiology of aging, mitotic cell cycle regulation
- PAGE, ROY C; PhD, 1967, UNIVERSITY OF WASHINGTON; connective-tissue pathology, chronic inflammation, immunopathology, periodontal disease
- PIEPKORN, MICHAEL W.; PhD, 1980, UNIVERSITY OF WASHINGTON; dermatology
- PREHN, RICHMOND T.; MD, 1947, LONG ISLAND UNIVERSITY; cancer research
- RABINOVITCH, PETER S.; PhD, 1980, UNIVERSITY OF WASHINGTON; cellular aging, preneoplastic disease, cell cycle abnormalities, DNA change
- REAY, DONALD T; MD, 1963, UNIVERSITY OF UTAH; MPA, 1978, SEATTLE UNIVERSITY; forensic medicine.
- REICHENBACH, DENNIS D; MD, 1958, UNIVERSITY OF WASHINGTON; cardiovascular pathology, myocardial cell injury
- REIDY, MICHAEL A; PhD, 1976, CAMBRIDGE UNIVERSITY (UK); identification of migration specific genes, expression of matrix metalloproteinases
- ROHRSCHEIDER, LARRY R; PhD, 1973, UNIVERSITY OF WISCONSIN; control of growth, differentiation, transformation by the c-fms proto-oncogene
- ROSENFELD, MICHAEL E.; PhD, 1981, UNIVERSITY OF WISCONSIN; mechanisms of atherogenesis and macrophage gene expression
- SALE, GEORGE E; MD, 1968, STANFORD UNIVERSITY; immunopathology of bone marrow transplantation, graft-versus-host
- SCHWARTZ, STEPHEN MARK; PhD, 1973, UNIVERSITY OF WASHINGTON; vascular biology, atherosclerosis, molecular basis of lineage, developmental biology, cell kinetics
- SHAW, CHENG-MEI; MD, 1950, NATIONAL TAIWAN UNIVERSITY; neuropathology, immunopathology, trace metal neurotoxicology
- SHULMAN, HOWARD M; MD, 1971, UNIVERSITY OF CALIFORNIA (LOS ANGELES); graft-versus-host disease; venoocclusive disease of the liver
- SMITH, GERALD R; PhD, 1970, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; molecular biology of genetic recombination and regulation of gene expression.
- SPENCE, ALEXANDER M; MD, 1965, UNIVERSITY OF CHICAGO; neurology, neuro-oncology.
- STAMATOYANNOPOULOS, G; MD, 1958, UNIVERSITY OF ATHENS (GREECE); DrMedSci, 1960, UNIVERSITY OF ATHENS (GREECE); medical genetics.
- SUMI, SHUZO MARK; MD, 1956, UNIVERSITY OF TORONTO (CANADA); neuropathology, neuromuscular disease, neurodegenerative diseases
- TAIT, JONATHAN F; PhD, 1983, WASHINGTON UNIVERSITY; biochemistry of blood coagulation, laboratory diagnosis of genetic disorders
- TAPSCOTT, STEPHEN J.; PhD, 1982, UNIVERSITY OF PENNSYLVANIA; molecular and developmental biology
- TRUE, LAWRENCE DASHIELL; MD, 1971, TULANE UNIVERSITY; urologic pathology, nuclear aspects of tumor differentiation
- VESSELLA, ROBERT L; PhD, 1974, UNIVERSITY OF MISSISSIPPI; tumor markers and immunology
- WIGHT, THOMAS; PhD, 1972, UNIVERSITY OF NEW HAMPSHIRE; connective

tissue biology and pathology, proteoglycans metabolism, atherosclerosis
WOLF, NORMAN S.; PhD, 1960, NORTH-WESTERN UNIVERSITY; hematopoietic stem cell dynamics and transplantation in radiation biology
YEUNG, RAYMOND S.; MD, 1982, UNIVERSITY OF TORONTO (CANADA); general and surgical oncology

Research Professor

ALBERS, JOHN J.; PhD, 1969, UNIVERSITY OF ILLINOIS; lipoprotein metabolism and pathophysiology
CHI, EMIL YIMUO; PhD, 1971, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); lung structures and function, mast cell secretion and inflammation
GALLOWAY, DENISE A.; PhD, 1976, CITY UNIVERSITY OF NEW YORK; viral pathogenesis and neoplasia
RAINES, ELAINE W.; MS, 1975, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); molecular mechanisms responsible for vascular cell migration
STEPHENS, KAREN G.; PhD, 1982, INDIANA UNIVERSITY; molecular genetics of human disease; human gene mapping

Associate Professor

BORNFELDT, KARIN E.; PhD, 1991, LINKOPING UNIVERSITY (SWEDEN); cardiovascular disease in diabetes, focusing on vascular muscle cells
CLURMAN, BRUCE E.; PhD, 1988, CORNELL UNIVERSITY; oncology
FINN, LAURA S.; MD, 1989, PENNSYLVANIA STATE UNIVERSITY; pediatric pathology
FLIGNER, CORINNE L.; MD, 1976, UNIVERSITY OF NEW MEXICO; autopsy and forensic pathology, fetal and perinatal pathology, forensic toxicology
HACKMAN, ROBERT C.; MD, 1971, STANFORD UNIVERSITY; infectious and pulmonary complications in immunocompromised patients
HEVNER, ROBERT F.; PhD, 1992, MEDICAL COLLEGE OF WISCONSIN; development of cerebral cortex
KAPUR, RAJ P.; MD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; normal and abnormal development of the enteric nervous system
KIEM, HANS-PETER; MD, 1987, UNIVERSITY OF ULM (GERMANY); oncology/hematology
KINSELLA, MICHAEL G.; PhD, 1978, UNIVERSITY OF OREGON; endothelial cell biology
LAWTON, THOMAS J.; MD, 1990, UNIVERSITY OF MICHIGAN; clinico-pathologic research in breast cancer with particular interest in lobular carcinoma
MYERSON, DAVID; PhD, 1979, ALBERT

EINSTEIN COLLEGE OF MEDICINE; the pathology of viral disease in humans
NELSON, PETER S.; MD, 1986, UNIVERSITY OF KANSAS; the study of human carcinogenesis using tools of genomics and bioinformatics
OLSON, JAMES M.; MD, 1991, UNIVERSITY OF MICHIGAN; hematology, oncology
OTT, SUSAN M.; MD, 1974, UNIVERSITY OF WASHINGTON; nephrology
PATTERSON, KATHLEEN; MD, 1976, UNIVERSITY OF IOWA; pediatric pathology
PORTER, PEGGY L.; MD, 1987, UNIVERSITY OF NEW MEXICO; identifying/understanding the molecular events associated with the initiation/progression of cancer
QWARNSTROM, EVA E.; PhD, 1984, UNIVERSITY OF LUND (SWEDEN); cell matrix interaction, cytokine signaling
RUBIN, BRIAN PAUL; PhD, 1995, CORNELL UNIVERSITY; bone and soft tissue tumors
SCHMIDT, RODNEY; PhD, 1984, UNIVERSITY OF WASHINGTON; surgical pathology, pulmonary pathology, sarcomas, image analysis, electron microscopy
SIMRELL, CHARLES R.; MD, 1978, UNIVERSITY OF FLORIDA; hematology and hematopathology.
THORNING, DAVID R.; MD, 1965, UNIVERSITY OF KANSAS; anatomic pathology, pulmonary pathology, tissue biology, electron microscopy
VINCENT, INEZ J.; PhD, 1987, INDIANA UNIVERSITY; pathogenesis of Alzheimer's disease
VIRGIN, JEFFREY B.; PhD, 1986, CASE WESTERN RESERVE UNIVERSITY; surgical pathology, cytopathology, autopsy pathology
ZHANG, JING; PhD, 1995, DUKE UNIVERSITY; neuropathology and ocular pathology, Parkinson's disease

Research Associate Professor

OSHIMA, JUNKO; PhD, 1992, BOSTON UNIVERSITY; pathobiology of aging
SIEBERT, JOSEPH ROBERT; PhD, 1985, UNIVERSITY OF WASHINGTON; pediatric pathology

Assistant Professor

ADLER, DAVID A.; PhD, 1996, UNIVERSITY OF WASHINGTON; mammalian x-chromosome inactivation
BORN, DONALD E.; PhD, 1986, UNIVERSITY OF VIRGINIA; family medicine, sports medicine, team care
BURMER, GLENNA C.; PhD, 1983, UNIVERSITY OF WASHINGTON; molecular events in tumor progression, molecular evolution, diagnostic molecular pathology
GARCIA, ROCHELLE; MD, 1989, UNIVERSITY OF WASHINGTON; cytology, gynecologic pathology

KUECHLE, MELANIE K.; MD, 1989, BAYLOR UNIVERSITY; dermatology
LEPPIG, KATHLEEN; MD, 1986, CASE WESTERN RESERVE UNIVERSITY; medical genetics
PARKS, WILLIAM A.; MD, 1988, WASHINGTON UNIVERSITY; Transforming growth factor beta signaling, endocytosis
RHIM, JONATHAN A.; MD, 1989, GEORGE WASHINGTON UNIVERSITY; molecular mechanisms of medical disease
SMITH, KELLY D.; PhD, 1996, UNIVERSITY OF IOWA; Immunology, Molecular Biology, Host-Pathogen Interactions, Genomics, Renal and Cardiac Pathology
WILLIAMS, KANDACE J.; PhD, 1987, DARTMOUTH COLLEGE; pathology, toxicology
WRIGHT, A MORGAN; MD, 1976, PENNSYLVANIA STATE UNIVERSITY; cytology, histology
YEH, MENG-CHE; PhD, 1997, UNIVERSITY OF PENNSYLVANIA; Surgical pathology with special interest in liver and gastrointestinal pathology

Research Assistant Professor

HU, QUBAI; PhD, 1995, UNIVERSITY OF ARKANSAS; Molecular mechanisms of Alzheimer pathogenesis emphasizing on neural adaptor FE65 and APP function
MONTINE, KATHLEEN S.; PhD, 1988, UNIVERSITY OF ROCHESTER; Alzheimer's disease, aging brain, and age-related neurodegenerative disease
REINECKE, HANS; PhD, 1995, UNIVERSITY OF FREIBURG (GERMANY); Myocardial infarction, strategies for repair, cell based therapy, gene therapy, stem cells.
SWANSON, KRISTIN R.; PhD, 1999, UNIVERSITY OF WASHINGTON; mathematical medicine&biology; mathematical modeling of pathological biosystems&imaging; complex systems
ZHENG, NATALIE N.; PhD, 1998, UNIVERSITY OF NEW SOUTH WALES(AUSTRALIA); T cell immunity in control of HIV infection and HIV pathogenesis

Lecturer

EK, MARIT; MBChB, 1959, UNIVERSITY OF CAPETOWN (SOUTH AFRICA); gynecological/breast pathology
PENDERGRASS, WILLIAM R.; PhD, 1977, UNIVERSITY OF WASHINGTON; DNA replication, caloric restriction, gerontology, invitro senescence

Pediatrics

Professor

BENNETT, FORREST C.; MD, 1970, UNIVERSITY OF MINNESOTA; child development and handicapped children

BERGMAN, ABRAHAM; MD, 1958, CASE WESTERN RESERVE UNIVERSITY; ambulatory pediatrics

BERNSTEIN, IRWIN D.; MD, 1967, NEW YORK UNIVERSITY; hematology, oncology

BURNS, JANE L.; MD, 1978, UNIVERSITY OF WASHINGTON; infectious diseases

CHANCE, PHILLIP F.; MD, 1978, UNIVERSITY OF TENNESSEE; pediatric neurology and genetics

CHRISTIE, DENNIS L.; MD, 1968, NORTHWESTERN UNIVERSITY; gastroenterology

CLARREN, STERLING K.; MD, 1973, UNIVERSITY OF MINNESOTA; congenital defects

CONNELL, FREDERICK A.; MD, 1972, NEW YORK UNIVERSITY; child health, child health services research, Medicaid, community health assessment

COOMBS, JOHN B.; MD, 1972, CORNELL UNIVERSITY; Health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

COREY, LAWRENCE; MD, 1971, UNIVERSITY OF MICHIGAN; laboratory medicine: diagnosis, therapy, and pathogenesis of viral infections, AIDS virus

DEISHER, ROBERT W.; MD, 1944, WASHINGTON UNIVERSITY; adolescent medicine

DEL BECCARO, MARK A.; MD, 1985, UNIVERSITY OF WASHINGTON; pediatric emergency medicine

DIEKEMA, DOUGLAS S.; MD, 1985, UNIVERSITY OF NORTH CAROLINA; MPH, 1993, UNIVERSITY OF WASHINGTON; pediatric emergency medicine

EDDY, ALLISON A.; MD, 1975, McMASTER UNIVERSITY (CANADA); nephrology

EMANUEL, IRVIN; MA, 1956, UNIVERSITY OF ARIZONA; MD, 1960, UNIVERSITY OF ROCHESTER; MS, 1966, UNIVERSITY OF WASHINGTON; epidemiology of maternal and child health problems, growth and development

EMERY, HELEN; MD, 1971, UNIVERSITY OF ADELAIDE (AUSTRALIA); Pediatric rheumatology - clinical, rehabilitation and health outcomes research

FOLSOM, RICHARD C.; PhD, 1979, UNIVERSITY OF WASHINGTON; pediatric audiology

FRENCH, JAMES W.; MD, 1963, UNIVERSITY OF MICHIGAN; pediatric cardiology

FRENKEL, LISA M.; MD, 1987, UNIVERSITY OF KANSAS; infectious diseases

GEYER, JEFFREY R.; MD, 1977, WAYNE STATE UNIVERSITY; hematology/oncology

GIBSON, RONALD L.; PhD, 1982, WASHINGTON UNIVERSITY; pulmonology

GLEASON, CHRISTINE A.; MD, 1979, UNIVERSITY OF ROCHESTER; neonatology

GROSSMAN, DAVID C.; MD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); MPH, 1990, UNIVERSITY OF WASHINGTON; injury control, Native American health, and pediatric health services research

GUNTHEROTH, WARREN G.; MD, 1952, HARVARD UNIVERSITY; pediatric cardiology

GURALNICK, MICHAEL J.; PhD, 1967, LEHIGH UNIVERSITY; developmental disabilities, peer relations, social and language development, evaluation systems

HAYDEN, PATRICIA; MD, 1953, UNIVERSITY OF ROCHESTER; congenital defects

HAYS, ROSS M.; MD, 1978, UNIVERSITY OF WASHINGTON; pediatric rehabilitation, medical ethics, neuromuscular diseases, congenital defects

HODSON, W. ALAN; MD, 1959, UNIVERSITY OF MANITOBA (CANADA); MMSc, 1964, OHIO STATE UNIVERSITY; neonatal and respiratory diseases

JACKSON, J CRAIG; MD, 1979, VANDERBILT UNIVERSITY; neonatal and respiratory diseases

JAFFE, KENNETH M.; MD, 1975, HARVARD UNIVERSITY; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects

JONES, THOMAS K.; MD, 1978, JEFFERSON MEDICAL COLLEGE; pediatric cardiology

LEMIRE, RONALD J.; MD, 1962, UNIVERSITY OF WASHINGTON; teratology

LYNN, ANNE; MD, 1975, STANFORD UNIVERSITY; pediatric anesthesiology

MARCUSE, EDGAR K.; MD, 1967, STANFORD UNIVERSITY; MPH, 1973, UNIVERSITY OF WASHINGTON; general pediatrics

MARTIN, LYNN D.; MD, 1982, UNIVERSITY OF WASHINGTON; pediatric anesthesiology

MASSAGLI, TERESA L.; MD, 1982, YALE UNIVERSITY; pediatric psychiatry

MAYOCK, DENNIS EDWARD; MD, 1975, OHIO STATE UNIVERSITY; neonatology and respiratory diseases

MC CAULEY, ELIZABETH; PhD, 1973, STATE UNIVERSITY OF NEW YORK (BUFFALO); developmental psychopathology focused on affective disorders, behavioral genetics

MC LAUGHLIN, JOHN F.; MD, 1970, NORTHWESTERN UNIVERSITY; congenital defects

MOSELEY, STEPHEN L.; PhD, 1981, UNIVERSITY OF WASHINGTON; molecular basis of pathogenesis in E. coli diarrhea.

MOURADIAN, WENDY ELYSE; MD, 1977, COLUMBIA UNIVERSITY; Ethics and quality of life in children's oral, craniofacial health.

NEFF, JOHN; MD, 1960, HARVARD UNIVERSITY; children with special health care needs

NOVACK, ALVIN H.; MD, 1958, TEMPLE UNIVERSITY; general pediatrics

OCHS, HANS D.; MD, 1962, UNIVERSITY OF FREIBURG (GERMANY); immunology

PAGON, ROBERTA A.; MD, 1972, HARVARD UNIVERSITY; medical genetics

PENDERGRASS, THOMAS W.; MD, 1971, UNIVERSITY OF TENNESSEE; MPH, 1979, UNIVERSITY OF WASHINGTON; hematology, oncology

PORTMAN, MICHAEL A.; MD, 1980, UNIVERSITY OF CINCINNATI; pediatric cardiology

QUAN, LINDA; MS, 1969, DARTMOUTH COLLEGE; MD, 1971, UNIVERSITY OF WASHINGTON; pediatric emergency medicine

RAMSEY, BONNIE W.; MD, 1976, HARVARD UNIVERSITY; cystic fibrosis, pulmonary

REDDING, GREGORY J.; MD, 1974, STANFORD UNIVERSITY; pediatric pulmonary medicine

RIVARA, FREDERICK P.; MD, 1974, UNIVERSITY OF PENNSYLVANIA; pediatric epidemiology and injury prevention and research

ROBERTSON, WILLIAM O.; MD, 1949, UNIVERSITY OF ROCHESTER; general pediatrics, toxicology

RUBENS, CRAIG E.; PhD, 1978, MEDICAL UNIVERSITY OF SOUTH CAROLINA; infectious diseases/pathogenesis of gram(+) bacterial infections

RUVALCABA, ROGELIO; MD, 1957, UNIVERSITY OF GUADALAJARA (MEXICO); endocrinology

SANDERS, JEAN E.; MD, 1970, UNIVERSITY OF IOWA; hematology, oncology

SCOTT, C RONALD; MD, 1959, UNIVERSITY OF WASHINGTON; diagnosis and nutritional management of genetic disorders of children

SHUGERMAN, RICHARD P.; MD, 1984, UNIVERSITY OF ALABAMA; general pediatrics

SHURTLEFF, DAVID B.; MD, 1955, TUFTS UNIVERSITY; congenital defects

SMITH, MARK S.; MD, 1969, UNIVERSITY OF VIRGINIA; adolescent medicine

SMITH, NATHAN J.; MD, 1945, UNIVERSITY OF WISCONSIN; sports medicine

STAPLETON, F. BRUDER; MD, 1972, UNIVERSITY OF KANSAS; nephrology

STEVENSON, JAMES G.; MD, 1970, BAYLOR UNIVERSITY; pediatric cardiology

TARCZY-HORNOCH, PETER; MD, 1989, STANFORD UNIVERSITY; bioinformatics and clinical informatics: clinical systems and integrating genetic databases

TARR, PHILLIP I.; MD, 1980, YALE UNIVERSITY; gastroenterology/infectious diseases

TAYLOR, JAMES A.; MD, 1980, UNIVERSITY OF NORTH CAROLINA; general pediatrics

WATKINS, SANDRA L; MD, 1981, UNIVERSITY OF TEXAS (HOUSTON); nephrology
 WEDGWOOD, RALPH J; MD, 1947, HARVARD UNIVERSITY; rheumatology
 WEINBERGER, EDWARD; MD, 1979, HARVARD UNIVERSITY; pediatric radiology
 WILSON, CHRISTOPHER B; MD, 1972, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immunology, infectious diseases
 WOODRUM, DAVID E; MD, 1965, UNIVERSITY OF ILLINOIS; neonatology
 WOODWARD, GEORGE A.; MD, 1983, TEMPLE UNIVERSITY; MBA, 1999, UNIVERSITY OF PENNSYLVANIA; Pediatric Emergency Medicine and Trauma, Transport Medicine, EMS, International Medicine, Business
 ZIMMERMAN, JERRY J.; PhD, 1975, UNIVERSITY OF WISCONSIN; critical-care medicine

Research Professor

FANTEL, ALAN G; PhD, 1974, UNIVERSITY OF WASHINGTON; embryology, teratology
 OSBORNE, WILLIAM R; PhD, 1972, UNIVERSITY OF LONDON; KING'S COLLEGE (UK); pediatric genetics

Associate Professor

ANDREWS, ROBERT G; MD, 1976, UNIVERSITY OF MINNESOTA; hematology/oncology
 ASTLEY, SUSAN J.; PhD, 1990, UNIVERSITY OF WASHINGTON; chronic childhood diseases.
 BOWDEN, RALEIGH A; MD, 1978, UNIVERSITY OF WASHINGTON; hematology/oncology
 BREWER, DAVID K; MD, 1972, HARVARD UNIVERSITY; pediatric radiology, angiography, computed tomography
 BROWNSTEIN, DENA R.; MD, 1982, UNIVERSITY OF WASHINGTON; pediatric emergency medicine
 CARTER, EDWARD R.; MD, 1981, VANDERBILT UNIVERSITY; Asthma, airway resistance measurements, medical adherence
 CHRISTAKIS, DIMITRI A.; MPH, 1998, UNIVERSITY OF WASHINGTON; MD, 1993, UNIVERSITY OF PENNSYLVANIA; general pediatrics
 CUNNINGHAM, MICHAEL L.; PhD, 1996, UNIVERSITY OF WASHINGTON; molecular, development, craniofacial, malformation, human, mouse, craniosynostosis, birth defects
 ENGLUND, JANET A.; MD, 1980, UNIVERSITY OF MICHIGAN; Viral Diagnosis & Treatment, Antiviral Drugs, Vaccines, Maternal Immunization, Immunocompromise Host
 FRANCIS, JULIE S.; MD, 1984, UNIVERSITY OF WASHINGTON; dermatology
 FRIEDMAN, DEBRA L.; MD, 1991, U OF MEDICINE & DENTISTRY OF NEW JERSEY; hematology/oncology

GRAHAM, ELINOR A.; MD, 1970, UNIVERSITY OF ROCHESTER; MPH, 1993, JOHNS HOPKINS UNIVERSITY; general pediatrics
 GUNTHER, DANIEL F; MD, 1992, UNIVERSITY OF CALIFORNIA (DAVIS); pediatric endocrinology
 HAWKINS, DOUGLAS S.; MD, 1990, HARVARD UNIVERSITY; hematology/oncology
 HERNDON, S PAUL; MD, 1970, GEORGE WASHINGTON UNIVERSITY; pediatric cardiology
 HOLM, VANJAA; MD, 1954, KAROLINSKA INSTITUTE (SWEDEN); child development
 HORNUNG, ROBIN L.; MD, 1990, YALE UNIVERSITY; MPH, 1996, UNIVERSITY OF NORTH CAROLINA; dermatology
 JARDINE, DAVID; MD, 1980, JOHNS HOPKINS UNIVERSITY; pediatric anesthesiology
 KAHN, STUART J.; MD, 1985, U OF MEDICINE & DENTISTRY OF NEW JERSEY; rheumatology
 KAPUR, RAJ P.; MD, 1988, UNIVERSITY OF SOUTHERN CALIFORNIA; normal and abnormal development of the enteric nervous system
 KAWABORI, ISAMU; MD, 1966, UNIVERSITY OF WASHINGTON; pediatric cardiology
 KLEIN, EILEEN J.; MD, 1988, JOHNS HOPKINS UNIVERSITY; pediatric emergency medicine
 KLETTER, GAD B; MD, 1982, SACKLER SCHOOL OF MEDICINE (ISRAEL); pediatric endocrinology
 LEHMAN, ROBERT M.; MD, 1978, TUFTS UNIVERSITY; adolescent medicine
 LIU, LENA L.; MD, 1992, UNIVERSITY OF PENNSYLVANIA; general pediatrics, type 2 diabetes
 LOZANO, PAULA; MD, 1989, HARVARD UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; general pediatrics, asthma, evidence-based medicine
 MARSHALL, SUSAN G; MD, 1980, UNIVERSITY OF CALIFORNIA (LOS ANGELES); neonatal and respiratory diseases
 MATTHEWS, DANA C.; MD, 1981, UNIVERSITY OF WASHINGTON; hematology/oncology
 MCDONALD, RUTH A.; MD, 1987, UNIVERSITY OF MINNESOTA; nephrology
 MELVIN, ANN JORNS; MD, 1986, TULANE UNIVERSITY; infectious diseases
 MELZER, SANFORD M.; MD, 1982, MT SINAI SCHOOL OF MEDICINE; general pediatrics
 MURPHY, JANET HAWORTH; MBChB, 1967, VICTORIA UNIVERSITY (UK); neonatal biology and respiratory disease
 MURRAY, KAREN F.; MD, 1990, JOHNS HOPKINS UNIVERSITY; gastroenterology
 OLSON, JAMES M.; MD, 1991, UNIVERSITY OF MICHIGAN; hematology, oncology

PARK, JULIE R.; MD, 1988, UNIVERSITY OF VERMONT; hematology, oncology
 PIHOKER, CATHERINE; MD, 1987, ALBANY MEDICAL COLLEGE; endocrinology
 ROSENBAUM, DAVID M; MD, 1977, ALBERT EINSTEIN COLLEGE OF MEDICINE; pediatric radiology
 SCHENKMAN, KENNETH A.; MD, 1986, INDIANA UNIVERSITY; pediatric anesthesia
 SMITH, SHERILYN; MD, 1989, BAYLOR UNIVERSITY; infectious diseases
 SOTERO DE MENEZES, MARCIO; MD, 1984, RIO DE JANEIRO ST. U. MED. SCH. (BRAZIL); pediatric neurology, epilepsy, EEG
 STOUT, JAMES W.; MAT, 1981, DUKE UNIVERSITY; MD, 1986, WAKE FOREST UNIVERSITY; childhood asthma, health services and epidemiology
 STRANDJORD, THOMAS P; MD, 1983, JOHNS HOPKINS UNIVERSITY; neonatal biology and respiratory diseases
 SULZBACHER, STEPHEN; PhD, 1971, UNIVERSITY OF WASHINGTON; psychiatry and behavioral sciences
 SYMONS, JORDAN; MD, 1992, COLUMBIA UNIVERSITY; nephrology
 VAVILALA, MONICA S.; MD, 1991, UNIVERSITY OF TEXAS (HOUSTON); pediatric pain management
 WALLACE, CAROL A; MD, 1973, UNIVERSITY OF MICHIGAN; immunology/rheumatology
 WEISS, AVERY H; MD, 1974, MIAMI UNIVERSITY (OHIO); pediatric ophthalmology, strabismus
 WOOLFREY, ANN E.; MD, 1984, UNIVERSITY OF MINNESOTA; pediatric hematology/oncology
 WRIGHT, JEFFREY A.; MD, 1978, UNIVERSITY OF MISSOURI; general pediatrics
 ZELIKOVIC, ISRAEL; MD, 1977, TEL AVIV UNIVERSITY (ISRAEL); nephrology

Research Associate Professor

SPIERS, PHILIP S.; PhD, 1966, OXFORD UNIVERSITY (UK); SIDS

Assistant Professor

BADEN, HARRIS P.; MD, 1989, UNIVERSITY OF TEXAS (GALVESTON); Perioperative care of infants and children with congenital heart disease.
 CHABRA, SHILPI; MBBS, 1986, BOMBAY UNIVERSITY (INDIA); MD, 1989, BOMBAY UNIVERSITY (INDIA); Care of normal & high risk newborns. Prevention of chronic lung disease. Epidemiology of gastroschisis
 EBEL, BETH E.; MS, 1989, OXFORD UNIVERSITY (UK); MD, 1996, HARVARD UNIVERSITY; MPH, 2001, UNIVERSITY OF WASHINGTON; pediatric injury prevention, community intervention programs

HING, ANNE V.; MD, 1985, WASHINGTON UNIVERSITY; Genetics and Craniofacial Development

KURATANI, JOHN D.; MD, 1990, TULANE UNIVERSITY; pediatric epilepsy, EEG

LEPPIG, KATHLEEN; MD, 1986, CASE WESTERN RESERVE UNIVERSITY; medical genetics

LINGAPPA, JAIRAM R.; PhD, 1987, HARVARD UNIVERSITY; The impact of genomics on public health response to infectious diseases

MCPHILLIPS, HEATHER A.; MD, 1994, UNIVERSITY OF CHICAGO; Patient safety and medication errors. Medical education. Vaccine safety.

PARIS, CAROLYN A.; MD, 1991, CORNELL UNIVERSITY; pediatric emergency medicine

RAFF, MICHAEL L.; MD, 1991, MCGILL UNIVERSITY (CANADA); Inherited disorders of metabolism and disorders of skeletal growth

ROBERTS, JOAN S.; MD, 1992, UNIVERSITY OF NEVADA; Pediatric critical care

SALEERNO, JACK; MD, 1996, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Pediatric cardiology with an expertise in electrophysiology and pacemaker implementation

SIDBURY, ROBERT; MD, 1993, DUKE UNIVERSITY; pediatric dermatology, inflammatory skin diseases: atopic dermatitis & vascular tumors of infancy.

SUSKIND, DAVID; MD, 1997, LOUISIANA STATE UNIVERSITY; Microchimerism and development of autoimmune diseases

TAMURA, GLEN S.; PhD, 1987, STANFORD UNIVERSITY; infectious diseases

WRIGHT, PAIGE LEANNE; MD, 1996, INDIANA UNIVERSITY; Injury prevention in children

ZINNER, SAMUEL; MD, 1994, UNIVERSITY OF CALIFORNIA (BERKELEY); Developmental & Behavioral Pediatric & Adolescent psychosocial & medical issues

Research Assistant Professor

HAMBLETT, NICOLE M.; PhD, 1999, UNIVERSITY OF WASHINGTON; Clinical trials, Cystic Fibrosis, Longitudinal data analysis

STARR, JACQUELINE R.; PhD, 2003, UNIVERSITY OF WASHINGTON; clinical and genetic epidemiology of craniofacial malformations, epidemiologic methods

Lecturer

POLIFKA, JANINE E.; PhD, 1985, UNIVERSITY OF LOUISVILLE; teratology

REES, JANE; MS, 1972, UNIVERSITY OF WASHINGTON; nutritional support of adolescent health, especially during pregnancy; eating disorders

SNIDERMAN KING, LISA C.; MS, 1999,

MCGILL UNIVERSITY (CANADA); Genetic metabolic disorders: Genetic counseling, management, clinical trials of new treatments

TRAHMS, CRISTINE M.; MS, 1972, UNIVERSITY OF WASHINGTON; growth and development of young children: metabolic disorders, special health care needs

Pharmacology

Professor

BEAVO, JOSEPH A.; PhD, 1970, VANDERBILT UNIVERSITY; roles and molecular mechanisms of cyclic nucleotide phosphodiesterase regulation of cell function

BOMSZTYK, KAROL; MD, 1977, UNIVERSITY OF ROCHESTER; role of cytokine-induced protein kinases in the regulation of gene expression

CATTERALL, WILLIAM; PhD, 1972, JOHNS HOPKINS UNIVERSITY; molecular biology of ion channels, molecular pharmacology and neurobiology

CHAVKIN, CHARLES; PhD, 1982, STANFORD UNIVERSITY; cell and molecular mechanisms of psychoactive opiate drugs to understand normal and pathophysiology

DORSA, DANIEL M.; PhD, 1977, UNIVERSITY OF CALIFORNIA (DAVIS); neuropharmacology, neurochemistry

HOL, WILHELMUS G.J.; PhD, 1971, UNIVERSITY OF GRONINGEN (NETHERLANDS); protein crystallography, drug design, vaccine development, and protein engineering

HORITA, AKIRA; PhD, 1954, UNIVERSITY OF WASHINGTON; neuropsychopharmacology

JUCHAU, MONT RAWLINGS; PhD, 1966, UNIVERSITY OF IOWA; developmental pharmacology, drug metabolism

KREBS, EDWIN G.; MD, 1943, WASHINGTON UNIVERSITY; intracellular signaling mechanisms involving protein phosphorylation

MC KNIGHT, G STANLEY; PhD, 1976, STANFORD UNIVERSITY; phosphorylation; gene expression and neuro/endocrine physiology in mice using genetic approaches

MOON, RANDALL T.; PhD, 1982, UNIVERSITY OF WASHINGTON; embryonic development; signal transduction; cancer biology

NATHANSON, NEIL; PhD, 1975, BRANDEIS UNIVERSITY; neurobiology; molecular analysis of neural signal transduction by muscarinic and neurokinin receptors

OMIECINSKI, CURTIS J.; PhD, 1980, UNIVERSITY OF WASHINGTON; molecular toxicology, genetic regulation/

expression of drug/chemical metabolizing enzymes

SLATTERY, JOHN T.; PhD, 1978, STATE UNIVERSITY OF NEW YORK (BUFFALO); pharmacokinetics/pharmacodynamics of alkylating agents, oncology/bone marrow transplant

STORM, DANIEL R.; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); molecular basis of neuroplasticity; cAMP and Ca²⁺ signal transduction systems in the CNS

TEMPEL, BRUCE L.; PhD, 1983, PRINCETON UNIVERSITY; molecular neurobiology/neurogenetics, especially potassium channel gene structure and function

VINCENZI, FRANK F.; PhD, 1965, UNIVERSITY OF WASHINGTON; membrane transport, autonomic and cardiovascular pharmacology

WATSON, EILEEN L.; PhD, 1970, UNIVERSITY OF UTAH; salivary gland physiology and regulation

Research Professor

SHELLENBERG, GERARD D.; PhD, 1978, UNIVERSITY OF CALIFORNIA (RIVERSIDE); mapping of familial Alzheimer disease genes and cloning of Werner's syndrome gene

Associate Professor

BAJJALIEH, SANDRA M.; PhD, 1989, UNIVERSITY OF WISCONSIN; molecular neurobiology

DE JONGH, KAREN S.; PhD, 1985, UNIVERSITY OF NEW SOUTH WALES(AUSTRALIA); characterization of the molecular components of excitability, mechani

HALPERN, LAWRENCE M.; PhD, 1961, ALBERT EINSTEIN COLLEGE OF MEDICINE; neuropharmacology

HAMBLIN, MARK W.; PhD, 1982, UNIVERSITY OF CALIFORNIA (SAN DIEGO); molecular and cell biology of serotonin receptors, geriatric psychiatry

KAHN, MICHAEL; PhD, 1983, YALE UNIVERSITY; molecular recognition, protein structure-function relationships, peptidomimetics

STELLA, NEPHI; PhD, 1995, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; microglia cells activation: involvement of endogenous cannabinoid ligands and their allied receptors

WANG, EDITH H.; PhD, 1991, COLUMBIA UNIVERSITY; Regulation of genes that control cellular proliferation and differentiation

XIA, ZHENGUI; PhD, 1991, UNIVERSITY OF WASHINGTON; neuronal apoptosis, neuronal gene regulation

Research Associate Professor

COOK, DAVID G.; PhD, 1991, YALE UNIVERSITY; molecular mechanisms of Alzheimers disease

SCHEUER, TODD; PhD, 1983, UNIVERSITY OF ROCHESTER; structure and function of ion channels in electricable cells, regulati

Assistant Professor

ZHENG, NING; PhD, 1997, UNIVERSITY OF TEXAS (SOUTHWESTERN); Protein X-ray crystallography

Research Assistant Professor

AMIEUX, PAUL S.; PhD, 1997, UNIVERSITY OF WASHINGTON; reproduction, microarrays, genome sciences

RYBALKIN, SERGEI D.; PhD, 1986, MOSCOW STATE UNIVERSITY (RUSSIA); Pharmacology, Signal transduction, Smooth muscle, Cyclic nucleotide phosphodiesterases.

WESTENBROEK, RUTH E.; PhD, 1987, UNIVERSITY OF WASHINGTON; expression of calcium channels in developing and adult nervous systems

Physiology and Biophysics

Professor

ALMERS, WOLFARD; PhD, 1971, UNIVERSITY OF ROCHESTER; skeletal muscle physiology

ANDERSON, MARJORIE E.; PhD, 1969, UNIVERSITY OF WASHINGTON; physiology of basal ganglia and thalamus; neural control of movement

BERGER, ALBERT J.; PhD, 1967, PRINCETON UNIVERSITY; PhD, 1976, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); neural and chemical control of respiration, neurobiology, synaptic transmission

BINDER, MARC D.; PhD, 1974, UNIVERSITY OF SOUTHERN CALIFORNIA; organization of spinal reflexes

BOTHWELL, MARK ALLEN; PhD, 1975, UNIVERSITY OF CALIFORNIA (BERKELEY); molecular and cellular physiology.

BRENGELMANN, GEORGE L.; PhD, 1967, UNIVERSITY OF WASHINGTON; temperature regulation, cutaneous blood flow.

CARLSON, STEVEN S.; PhD, 1975, UNIVERSITY OF CALIFORNIA (BERKELEY); molecular and cellular physiology of synaptic transmission

CONLEY, KEVIN E.; PhD, 1983, UNIVERSITY OF WISCONSIN; muscle metabolism and energetics in vivo

CRILL, WAYNE E.; MD, 1962, UNIVERSITY OF WASHINGTON; properties of spinal and cortical neurons, mechanisms of repetitive firing of CNS neurons

DETWILER, PETER B.; PhD, 1970, GEORGETOWN UNIVERSITY; physiology of photoreceptors

FEIGL, ERIC O.; MD, 1958, UNIVERSITY OF MINNESOTA; cardiovascular physiology, coronary and cerebral circulation

FETZ, EBERHARD; PhD, 1966, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; cortical regulation of movement

FROEHNER, STANLEY C.; PhD, 1973, CALIFORNIA INSTITUTE OF TECHNOLOGY; molecular mechanisms of synapse formation and muscle disease

FUCHS, ALBERT F.; PhD, 1966, JOHNS HOPKINS UNIVERSITY; oculomotor physiology, vision

GLENNY, ROBB; MD, 1984, UNIVERSITY OF VIRGINIA; determinants of regional pulmonary blood flow and ventilation distribution

GORDON, ALBERT M.; PhD, 1961, CORNELL UNIVERSITY; skeletal and cardiac muscle physiology/biophysics

HILDEBRANDT, JACOB; PhD, 1966, UNIVERSITY OF WASHINGTON; respiratory physiology

HILLE, BERTIL; PhD, 1967, ROCKEFELLER UNIVERSITY; receptors and ion channels of excitable membranes; cell signaling; intracellular calcium dynamics

HLASTALA, MICHAEL P.; PhD, 1969, STATE UNIVERSITY OF NEW YORK (BUFFALO); respiratory physiology, inert gas analysis of respiratory function

HORNBEIN, THOMAS F.; MD, 1956, WASHINGTON UNIVERSITY; physiology

KENNEDY, THELMA T.; PhD, 1955, UNIVERSITY OF CHICAGO; cerebral cortical networks

KOERKER, DONNA J.; PhD, 1970, UNIVERSITY OF MICHIGAN; endocrinology, intermediate metabolism of carbohydrates

KUSHMERICK, MARTIN J.; PhD, 1966, UNIVERSITY OF PENNSYLVANIA; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy

MACKIE, KENNETH P.; MD, 1984, YALE UNIVERSITY; molecular and cell biological studies of cannabinoid receptor signaling

RANSOM, BRUCE ROBERT; PhD, 1972, WASHINGTON UNIVERSITY; neurology, neuroscience research

ROBERTSON, H. THOMAS; MD, 1968, HARVARD UNIVERSITY; respiratory diseases

ROWELL, LORING B.; PhD, 1962, UNIVERSITY OF MINNESOTA; regulation of blood flow, exercise physiology

RUBEL, EDWIN W.; PhD, 1969, MICHIGAN STATE UNIVERSITY; developmental neurobiology, with special emphasis on vertebrate auditory system development

SCHER, ALLEN M.; PhD, 1951, YALE UNIVERSITY; electrophysiology of heart, baroreceptor reflexes

SCHWINDT, PETER C.; PhD, 1972, UNIVERSITY OF WASHINGTON; properties of spinal and cortical neurons, mechanisms of repetitive firing and convulsive activity.

SHADLEN, MICHAEL N.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); neurobiology of vision and cognition

SMITH, ORVILLE A.; PhD, 1953, MICHIGAN STATE UNIVERSITY; central regulation of cardiovascular function

SPAIN, WILLIAM; MD, 1977, COLUMBIA UNIVERSITY; signal transduction in the central nervous system

STAHL, WILLIAM L.; PhD, 1963, UNIVERSITY OF PITTSBURGH; neurochemistry of brain ATPase systems.

STEINER, ROBERT A.; PhD, 1975, UNIVERSITY OF OREGON; neuroendocrinology, neuroscience, endocrinology

SWENSON, ERIK R.; MD, 1979, UNIVERSITY OF CALIFORNIA (SAN DIEGO); pulmonary medicine.

TELLER, DAVIDA Y.; PhD, 1965, UNIVERSITY OF CALIFORNIA (BERKELEY); vision, psychophysics, development of vision

VAN CITTERS, ROBERT L.; MD, 1953, UNIVERSITY OF KANSAS; cardiovascular physiology

WORDEMAN, LINDA; PhD, 1988, UNIVERSITY OF CALIFORNIA (BERKELEY); mitosis and myofibril formation

ZAGOTTA, WILLIAM N.; PhD, 1989, STANFORD UNIVERSITY; molecular mechanisms of ion channel function

Research Professor

BABCOCK, DONNER; PhD, 1971, OREGON STATE UNIVERSITY; ion channels of sperm cells

COOK, DANIEL L.; PhD, 1980, UNIVERSITY OF WASHINGTON; Functional bioinformatics; pancreatic b-cell electrical activity and insulin release.

POWERS, RANDALL K.; PhD, 1982, UNIVERSITY OF WASHINGTON; spinal cord neurophysiology

WINN, ROBERT K.; PhD, 1974, UNIVERSITY OF WASHINGTON; pulmonary physiology, neutrophil immigration and monoclonal antibody

Associate Professor

GINIGER, EDWARD SCOTT; PhD, 1988, HARVARD UNIVERSITY; neural development, mechanism of axon guidance, genetic specification of brain structure

GORDON, SHARONA E.; PhD, 1994, BROWN UNIVERSITY; molecular mechanisms of ion channel gating in visual and olfactory transduction

RIEKE, FREDERICK MARTIN; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); sensory signal processing and computation

Research Associate Professor

GORMAN, MARK; PhD, 1979, UNIVERSITY OF MICHIGAN; control of coronary blood flow
KOH, DUK-SU; PhD, 1992, UNIVERSITY OF LEIPZIG (GERMANY); regulation of exocytosis

Assistant Professor

FAIRHALL, ADRIENNE L; PhD, 1997, WEIZMANN INSTITUTE FOR SCIENCE (ISRAEL); computational neuroscience
JAGADEESH, BHARATHI; PhD, 1993, NORTHWESTERN UNIVERSITY; neural basis of visual learning and memory

Psychiatry

Professor

AVERY, DAVID H; MD, 1972, WASHINGTON UNIVERSITY; treatment of depression, seasonal affective disorder, transcranial magnetic stimulation
AYLWARD, ELIZABETH H.; PhD, 1982, CORNELL UNIVERSITY; structural and functional neuroimaging in neuropsychiatric disorders, developmental psychology
BECKER, JOSEPH; PhD, 1958, DUKE UNIVERSITY; psychosocial aspects of depression
BIRD, THOMAS D.; MD, 1968, CORNELL UNIVERSITY; neurology, neurogenetics
BORSON, SOO; MD, 1969, STANFORD UNIVERSITY; geriatric psychiatry
BOWDEN, DOUGLAS M; MD, 1965, STANFORD UNIVERSITY; neural substrates of learning and memory
BUCHWALD, DEDRA S; MD, 1981, UNIVERSITY OF CALIFORNIA (SAN DIEGO); internal medicine
CALSYN, DONALD; PhD, 1979, UNIVERSITY OF WASHINGTON; drug abuse treatment, AIDS prevention
CARR, JOHN E; PhD, 1963, SYRACUSE UNIVERSITY; phobic disorders, patient therapist matching & therapy outcome, cross-cultural psychopathology
COWLEY, DEBORAH S; MD, 1980, UNIVERSITY OF PENNSYLVANIA; anxiety disorders, psychiatric disorders during pregnancy and postpartum
CRAFT, SUZANNE; PhD, 1985, UNIVERSITY OF TEXAS (AUSTIN); neuropsychology of attention and memory in development and aging
DAGER, STEPHEN R; MD, 1978, UNIVERSITY OF NEBRASKA; application of functional brain imaging techniques to investigate neuropsychiatric disorders
DAWSON, GERALDINE; PhD, 1979, UNIVERSITY OF WASHINGTON; developmental disabilities, autism, and neuropsychology
DIKMEN, SUREYYA S; PhD, 1973, UNIVERSITY OF WASHINGTON;

clinical neuropsychology, traumatic brain injury
DOERR, HANS O; PhD, 1965, FLORIDA STATE UNIVERSITY; psychophysiology of central and autonomic nervous systems, neuropsychology
DONOVAN, DENNIS; PhD, 1980, UNIVERSITY OF WASHINGTON; cognitive-behavioral factors in substance abuse and addictive behaviors
DORSA, DANIEL M; PhD, 1977, UNIVERSITY OF CALIFORNIA (DAVIS); neuropharmacology, neurochemistry
DUNNER, DAVID L; MD, 1965, WASHINGTON UNIVERSITY; diagnosis and treatment of depression
DWORKIN, SAMUEL F; PhD, 1969, NEW YORK UNIVERSITY; dentistry and clinical psychology, pain, psychosomatic and illness-related behavior.
HEIMAN, JULIA R; PhD, 1975, STATE UNIV OF NEW YORK (STONY BROOK); sexuality and sexual relationships, prevention and treatment of family abuse
HORITA, AKIRA; PhD, 1954, UNIVERSITY OF WASHINGTON; neuropsychopharmacology
KATON, WAYNE J; MD, 1976, UNIVERSITY OF OREGON; depression, panic disorder, somatization, adherence
MC CANN, BARBARA S.; PhD, 1984, RUTGERS UNIVERSITY; behavior change, health, nutrition, psychological stress, cardiovascular disease, diabetes, obesity
MC CAULEY, ELIZABETH; PhD, 1973, STATE UNIVERSITY OF NEW YORK (BUFFALO); developmental psychopathology focused on affective disorders, behavioral genetics
PESKIND, ELAINE R.; MD, 1986, UNIVERSITY OF WASHINGTON; neuroendocrinology of aging, Alzheimer's and PTSD, neurobiology of noncognitive behavioral problems
RASKIND, MURRAY; MD, 1968, COLUMBIA UNIVERSITY; aging and Alzheimer's disease
RASKIND, WENDY H; PhD, 1977, UNIVERSITY OF WASHINGTON; medical genetics.
RIES, RICHARD K.; MD, 1975, NORTHWESTERN UNIVERSITY; severe mental illness treatment, addictions, health services outcomes
ROBINSON, NANCY M.; PhD, 1958, STANFORD UNIVERSITY; psychology
ROMANO, JOAN; PhD, 1982, UNIVERSITY OF PITTSBURGH; clinical psychology
ROY-BYRNE, PETER; MD, 1978, TUFTS UNIVERSITY; diagnosis and psychopharmacology of anxiety, depression, and ADHD in adults
SAXON, ANDREW J; MD, 1977, TUFTS UNIVERSITY; addiction psychiatry
SPELTZ, MATTHEW L.; PhD, 1980, UNIVERSITY OF MISSOURI; developmental psychotherapy, family therapy, pediatric behavioral medicine

STREISSGUTH, ANN P; PhD, 1964, UNIVERSITY OF WASHINGTON; psychology and behavioral teratology
SULLIVAN, MARK D.; PhD, 1982, VANDERBILT UNIVERSITY; depression and chronic medical illness, chronic pain, ethics, quality of life
TOWNES, BRENDA D; PhD, 1970, UNIVERSITY OF WASHINGTON; psychology
TRUPIN, ERIC W; PhD, 1974, UNIVERSITY OF WYOMING; psychology
TUCKER, GARY J.; MD, 1960, CASE WESTERN RESERVE UNIVERSITY; neuropsychiatry
TURNER, JUDITH A; PhD, 1979, UNIVERSITY OF CALIFORNIA (LOS ANGELES); psychology
UNUTZER, JURGEN; MA, 1988, UNIVERSITY OF CHICAGO; MPH, 1996, UNIVERSITY OF WASHINGTON; MD, 1990, VANDERBILT UNIVERSITY; Mental health services in primary care. Depression & comorbid medical illness. Late-life depression
VARLEY, C K; MD, 1973, UNIVERSITY OF WASHINGTON; attention deficit hyperactivity disorder, pediatric psychopharmacology
VEITH, RICHARD; MD, 1973, UNIVERSITY OF WASHINGTON; gerontology
VITALIANO, PETER P; PhD, 1975, SYRACUSE UNIVERSITY; psychiatric methodology (epidemiology, design, psychometrics), behavioral medicine
VITIELLO, MICHAEL V; PhD, 1980, UNIVERSITY OF WASHINGTON; Sleep, sleep disorders, circadian rhythms, aging, behavioral medicine
WALKER, EDWARD A.; MD, 1983, UNIVERSITY OF WASHINGTON; consultation-liaison psychiatry, medically unexplained physical symptoms
WARD, NICHOLAS G; MD, 1973, CORNELL UNIVERSITY; treatment resistant mood disorders, psychopharmacology
ZHOU, XIAO-HUA ANDREW; PhD, 1991, OHIO STATE UNIVERSITY; Biostatistics, health services research, mental health research

Research Professor

LATTEMANN, DIANNE; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); Effect of Regulatory Peptides on Feeding and Behavior and Metabolism

Associate Professor

ARMSTRONG, HUBERT E; PhD, 1963, SYRACUSE UNIVERSITY; clinical psychology
CALDERON, ROSEMARY; PhD, 1988, UNIVERSITY OF WASHINGTON; mental health and deafness, childhood psychopathology, early intervention
CARLIN, ALBERT S; PhD, 1964, SYRACUSE UNIVERSITY; clinical psychology

- CHANEY, EDMUND; PhD, 1976, UNIVERSITY OF WASHINGTON; clinical psychology
- CIECHANOWSKI, PAUL S.; MD, 1991, MCGILL UNIVERSITY (CANADA); consultation-liaison
- COMTOIS, KATHERINE ANN; PhD, 1992, UNIVERSITY OF MARYLAND; services research, borderline personality disorder, women, dual diagnosis
- DAGADAKIS, CHRISTOS S.; MD, 1974, UNIVERSITY OF WASHINGTON; MPH, 1975, UNIVERSITY OF WASHINGTON; emergency psychiatry, mental health managed care, psychiatric disability, stress management
- DENNY, MARY C.; MA, 1989, GRADUATE THEOLOGICAL UNION; counseling psychology
- DOBIE, DORCAS J.; MD, 1984, UNIVERSITY OF MICHIGAN; geriatric psychiatry
- DUBACH, MARK F.; PhD, 1983, UNIVERSITY OF WASHINGTON; anthropology
- DUNN, CHRISTOPHER W.; PhD, 1994, UNIVERSITY OF FLORIDA; Research effectiveness of Motivational Interviewing training for mental health & medical clinicians
- EGAN, KELLY J.; PhD, 1980, UNIVERSITY OF WASHINGTON; clinical psychology
- ERICKSON, RICHARD C.; PhD, 1969, UNIVERSITY OF WASHINGTON; clinical psychology
- FANN, JESSE R.; MD, 1989, NORTHWESTERN UNIVERSITY; MPH, 1995, UNIVERSITY OF WASHINGTON; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium
- HAMBLIN, MARK W.; PhD, 1982, UNIVERSITY OF CALIFORNIA (SAN DIEGO); molecular and cell biology of serotonin receptors, geriatric psychiatry
- KIVLAHAN, DANIEL R.; PhD, 1983, UNIVERSITY OF MISSOURI; evaluating assessment, prevention, and treatment approaches for addictive behaviors
- LAMPE, THOMAS H.; MD, 1977, INDIANA UNIVERSITY; Alzheimer's disease, post-traumatic stress disorder, neuroendocrinology
- LARIMER, MARY E.; PhD, 1992, UNIVERSITY OF WASHINGTON; prevention of alcohol problems among college students
- LEVERENZ, JAMES B.; MD, 1985, UNIVERSITY OF WASHINGTON; neurology, psychiatry and behavioral sciences, Alzheimer's
- MC CLELLAN, JON M.; MD, 1984, UNIVERSITY OF MICHIGAN; child psychiatry
- MCFALL, MILES E.; PhD, 1981, UNIVERSITY OF MONTANA; clinical psychology
- MILLER, MARGARET A.; PhD, 1984, UNIVERSITY OF WASHINGTON; neurobiology, neuroendocrinology
- MURBURG, MICHELE; MD, 1978, ALBERT EINSTEIN COLLEGE OF MEDICINE; neurobiology of PTSD, PTSD in special populations, psychiatric consequences of workplace harassment
- NEUMAIER, JOHN F.; PhD, 1989, UNIVERSITY OF WASHINGTON; neurobiology of stress and depression; regulation of serotonin receptors
- PASCUALY, O. MARCELLA; MD, 1982, UNIVERSIDAD JAVERIANA (COLOMBIA); geriatric psychiatry
- PEPPING, MARY; PhD, 1981, WASHINGTON STATE UNIVERSITY; psychosocial outcome after TBI and mild TBI; neuropsychological features of dementia and mild TBI
- PETRIE, ERIC C.; MS, 1981, UNIVERSITY OF WISCONSIN; MD, 1985, UNIVERSITY OF WASHINGTON; psychopharmacology, schizophrenia, post-traumatic stress disorder
- REOUX, JOSEPH P.; MD, 1985, UNIVERSITY OF TEXAS (HOUSTON); addiction psychiatry, substance withdrawal syndromes, pharmacotherapy, clinical guidelines
- SCHER, MARYONDA; MD, 1954, UNIVERSITY OF WASHINGTON; dissociative disorders/PTSD
- SCOTT, DAVID T.; PhD, 1978, YALE UNIVERSITY; natural history of premature infants, efficacy of early intervention for premature infants
- SHORES, MOLLY M.; MD, 1987, UNIVERSITY OF WASHINGTON; geriatric psychiatry
- SLOAN, KEVIN L.; MD, 1986, UNIVERSITY OF CHICAGO; dual disorders/addictions
- SREBNIK, DEBRA S.; PhD, 1992, UNIVERSITY OF VERMONT; public mental health services research, program and policy evaluation, community psychology
- STELLA, NEPHI; PhD, 1995, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; microglia cells activation: involvement of endogenous cannabinoid ligands and their allied receptors
- SULZBACHER, STEPHEN; PhD, 1971, UNIVERSITY OF WASHINGTON; psychiatry and behavioral sciences
- SYRJALA, KAREN L.; PhD, 1983, BOSTON UNIVERSITY; oncology, pain
- TSUANG, DEBBY W.; MD, 1988, UNIVERSITY OF IOWA; genetics of schizophrenia and late-life dementia
- ULDALL, KARINA K.; MD, 1987, UNIVERSITY OF MISSOURI; HIV/AIDS, health services
- VERHULST, JOHAN; MD, 1964, CATHOLIC UNIVERSITY OF LOUVAIN (BELGIUM); clinical psychiatry, marital therapy
- VILLACRES, ENRIQUE C.; MD, 1981, MEDICAL COLLEGE OF WISCONSIN; signal transduction and role of cAMP cascade proteolytic and learning
- WINGERTSON, DANE K.; MD, 1987, UNIVERSITY OF WASHINGTON; antipsychotic medications and pharmaco-economic issues
- WOMACK, WILLIAM M.; MD, 1961, UNIVERSITY OF VIRGINIA; behavioral medicine, pediatric headache, stress/anxiety disorders, juvenile offenders
- Research Associate Professor**
- LOGSDON, REBECCA G.; PhD, 1986, OKLAHOMA STATE UNIVERSITY; geriatric psychology, Alzheimer's disease, caregiving
- MCCURRY, SUSAN MELANCON; PhD, 1991, UNIVERSITY OF NEVADA; dementia, aging, older adults, depression, sleep, psychotherapy intervention research
- MOE, KAREN E.; PhD, 1981, UNIVERSITY OF WASHINGTON; estrogen replacement therapy in women
- RUSSO, JOAN E.; PhD, 1989, UNIVERSITY OF WASHINGTON; philosophy/psychology
- WILKINSON, CHARLES W.; PhD, 1977, UNIVERSITY OF CALIFORNIA (SANTA BARBARA); physiological psychology
- Assistant Professor**
- BENNETT, WILLIAM M.; MD, 1992, UNIVERSITY OF BRITISH COLUMBIA (CANADA); Primary Care Psychiatry, Consolation-Liaison Psychiatry, Cross Cultural Psychiatry
- HARRIS, VICTORIA L.; MD, 1989, UNIVERSITY OF BRITISH COLUMBIA (CANADA); subspecialty ABPN certification in forensic psychiatry
- MELVILLE, JENNIFER L.; MD, 1995, UNIVERSITY OF CALIFORNIA (LOS ANGELES); MPH, 2001, UNIVERSITY OF WASHINGTON; Depression in Obstetrics and Gynecology
- PASIC, JAGODA; PhD, 1990, UNIVERSITY OF LONDON; KING'S COLLEGE (UK); mood disorders, depression in medical conditions, depression in heart disease
- RIMMELE, CARL T.; PhD, 1988, UNIVERSITY OF NEW MEXICO; clinical psychology
- SAWCHUK, CRAIG NEIL; PhD, 1999, UNIVERSITY OF ARKANSAS; Adult anxiety disorders, medical fears, & health care service utilization in underserved populations
- STORCK, MICHAEL G.; MD, 1980, MEDICAL COLLEGE OF OHIO; early and late adolescent development, clinical ethnography, integrative medicine, psychiatry
- Research Assistant Professor**
- CHERRIER, MONIQUE M.; PhD, 1994, WASHINGTON STATE UNIVERSITY; Neuropsychology, Aging, Neuroendocrinology, Dementias
- Instructor**
- CHEN, JIM C.; MD, 1991, HAHNEMANN MEDICAL COLLEGE; general adult, geriatric, and cross-cultural psychiatry

Radiation Oncology

Professor

AUSTIN-SEYMOUR, MARY M.; MD, 1978, UNIVERSITY OF CHICAGO; therapeutic radiology.

BLASKO, JOHN C.; MD, 0, UNIVERSITY OF MARYLAND; therapeutic radiology

CHO, PAUL S.; PhD, 1989, UNIVERSITY OF CALIFORNIA (LOS ANGELES); medical radiation physics

GOODKIN, ROBERT; MD, 1964, CHICAGO MEDICAL SCHOOL; neurological surgery.

GROUDINE, MARK; PhD, 1976, UNIVERSITY OF PENNSYLVANIA; chromatin structure and gene activity

KALET, IRA J.; PhD, 1968, PRINCETON UNIVERSITY; computer simulation of radiation therapy, artificial intelligence, computer graphics

KOH, WUI-JIN; MD, 1984, LOMA LINDA UNIVERSITY; therapeutic radiology.

KROHN, KENNETH A.; PhD, 1971, UNIVERSITY OF CALIFORNIA (DAVIS); chemistry, radiation oncology

LARAMORE, GEORGE E.; PhD, 1969, UNIVERSITY OF ILLINOIS; therapeutic radiology.

PELTON, JAMES G.; MD, 1981, UNIVERSITY OF NEBRASKA; therapeutic radiology.

RUSSELL, KENNETH J.; MD, 1979, HARVARD UNIVERSITY; therapeutic radiology.

WILBUR, D. SCOTT; PhD, 1978, UNIVERSITY OF CALIFORNIA (IRVINE); radiochemistry.

Associate Professor

RAJENDRAN, JOSEPH; MBBS, 1973, MADURAI UNIVERSITY (INDIA); MD, 1980, CHRISTIAN MEDICAL COLLEGE; nuclear medicine

SCHWARTZ, JEFFREY L.; PhD, 1979, UNIVERSITY OF TEXAS (DALLAS); radiation biology

WALLNER, KENT E.; MD, 1981, OHIO STATE UNIVERSITY; therapeutic radiology

Radiology

Professor

AYLWARD, ELIZABETH H.; PhD, 1982, CORNELL UNIVERSITY; structural and functional neuroimaging in neuropsychiatric disorders, developmental psychology

BASSINGTHWAIGHTE, JAMES; PhD, 1964, MAYO MEDICAL SCHOOL/GRADUATE SCHOOL; computer analysis of transport mechanisms in blood and tissues.

BEAUCHAMP, NORMAN J.; MD, 1990, MICHIGAN STATE UNIVERSITY; Acute stroke diagnosis using advanced imaging techniques to extend the treatment window for stroke

BLACKMORE, CHRISTOPHER C.; MD, 1990, UNIVERSITY OF ROCHESTER; MPH, 1997, UNIVERSITY OF WASHINGTON; body imaging, teleradiology, digital radiology, MRI/CT

BUSH, WILLIAM H.; MD, 1967, OREGON HEALTH SCIENCES UNIVERSITY; genitourinary radiology

CALDWELL, JAMES H.; MD, 1970, UNIVERSITY OF MISSOURI; positron emission tomography imaging of myocardial oxygenation, metabolism and sympathetic function

CHESNUT, CHARLES; MD, 1966, UNIVERSITY OF FLORIDA; nuclear medicine

COHEN, WENDY; MD, 1975, HARVARD UNIVERSITY; neuroradiology

CONLEY, KEVIN E.; PhD, 1983, UNIVERSITY OF WISCONSIN; muscle metabolism and energetics in vivo

DAGER, STEPHEN R.; MD, 1978, UNIVERSITY OF NEBRASKA; application of functional brain imaging techniques to investigate neuropsychiatric disorders

EARY, JANET F.; MD, 1980, MICHIGAN STATE UNIVERSITY; nuclear medicine

EFFMANN, ERIC L.; MD, 1967, INDIANA UNIVERSITY; pediatric radiology

ELLENBOGEN, RICHARD G.; MD, 1983, BROWN UNIVERSITY; pediatric neurosurgery, neuro-oncology, complex spine

FIGLEY, MELVIN M.; MD, 1944, HARVARD UNIVERSITY; thoracic and pulmonary radiology

FREENY, PATRICK C.; MD, 1968, UNIVERSITY OF OKLAHOMA; abdominal radiology, computed tomography

GODWIN, J. DAVID; MD, 1971, STANFORD UNIVERSITY; pulmonary radiology

GRAHAM, C BENJAMIN; MD, 1958, UNIVERSITY OF WASHINGTON; pediatric, neonatal radiology

HARLEY, JOHN D; MD, 1966, WASHINGTON UNIVERSITY; general radiology and angiography

HAYES, CECIL E.; PhD, 1973, HARVARD UNIVERSITY; physics, MRI

HAYNOR, DAVID R; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); medical image processing and segmentation; image deformation; functional MRI; expression arrays

HUNTER, JOHN C.; MD, 1970, UNIVERSITY OF ILLINOIS; musculoskeletal, radiology, MRI

JARVIK, JEFFREY G; MD, 1987, UNIVERSITY OF CALIFORNIA (SAN DIEGO); neuroradiology, outcomes research

KIM, YONGMIN; PhD, 1982, UNIVERSITY OF WISCONSIN; computer architecture, imaging systems, medical imaging, computer graphics, multimedia, home healthc

KROHN, KENNETH A.; PhD, 1971, UNIVERSITY OF CALIFORNIA (DAVIS); chemistry, radiation oncology

KUSHMERICK, MARTIN J.; PhD, 1966, UNIVERSITY OF PENNSYLVANIA; muscle contraction, magnetic resonance, metabolic imaging NMR spectroscopy

LEHMAN, CONSTANCE D.; PhD, 1990, YALE UNIVERSITY; mammography, women's breast imaging

LEWELLEN, THOMAS; PhD, 1972, UNIVERSITY OF WASHINGTON; bioengineering, electrical engineering

LICHTENSTEIN, JOEL E.; MD, 1972, OHIO STATE UNIVERSITY; gastrointestinal radiology, computed tomography

MANKOFF, DAVID A.; PhD, 1988, UNIVERSITY OF PENNSYLVANIA; HIGH COUNT RATE PET IMAGING

MANN, FREDERICK A.; MD, 1975, INDIANA UNIVERSITY; emergency and trauma radiology

MARAVILLA, KENNETH R.; MD, 1970, STATE UNIVERSITY OF NEW YORK (BROOKLYN); neuroradiology and neurosurgery

MOSS, ALBERT A.; MD, 1967, STATE UNIV OF NEW YORK (UPSTATE MED CT); gastrointestinal radiology, computed tomography

NELP, WIL B; MD, 1955, JOHNS HOPKINS UNIVERSITY; nuclear medicine

NELSON, JAMES A.; MD, 1965, HARVARD UNIVERSITY; diagnostic radiology with basic research in related sciences

O'SULLIVAN, S. FINBARR; PhD, 1983, UNIVERSITY OF WISCONSIN; nonparametric curve estimation, inverse problems, radiology

RICHARDS, TODD L.; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); nuclear magnetic resonance imaging, spectroscopy of the brain in demyelinating diseases

RICHARDSON, MICHAEL L.; MD, 1975, BAYLOR UNIVERSITY; bone and joint radiology and musculoskeletal radiology

ROHRMANN JR, CHARLES A.; MD, 1966, UNIVERSITY OF WASHINGTON; gastrointestinal radiology

SHAW, DENNIS; MD, 1983, UNIVERSITY OF WASHINGTON; neuroradiology, pediatric radiology

SHUMAN, WILLIAM P; MD, 1973, STATE UNIV OF NEW YORK (UPSTATE MED CT); Body Computed Tomography, Body Magnetic Resonance Imaging, Administration of Academic Radiology Dept

STERN, ERIC J.; MD, 1985, U OF MEDICINE & DENTISTRY OF NEW JERSEY; chest radiology

STEWART, BRENT K.; PhD, 1988, UNIVERSITY OF CALIFORNIA (LOS ANGELES); biomedical physics, biomedical image processing, medical imaging, medical information systems

TALNER, LEE B.; MD, 1963, YALE UNIVERSITY; genitourinary radiology

WEINBERGER, EDWARD; MD, 1979, HARVARD UNIVERSITY; pediatric radiology

WILSON, ANTHONY J.; MBBChir, 1972, OTAGO UNIVERSITY (NEW ZEALAND); orthopaedic trauma imaging, teleradiology, digital radiography, MRI/CT
YUAN, CHUN; PhD, 1988, UNIVERSITY OF UTAH; magnetic resonance imaging in medical application

Associate Professor

ANDREWS, ROBERT TORRANCE; MD, 1990, UNIVERSITY OF CALIFORNIA (SAN DIEGO); Vascular and interventional radiology; endovascular therapy
BREWER, DAVID K.; MD, 1972, HARVARD UNIVERSITY; pediatric radiology, angiography, computed tomography
DALLEY, ROBERT W.; MD, 1982, UNIVERSITY OF UTAH; neuroradiology
DUBINSKY, THEODORE J.; MD, 1983, UNIVERSITY OF MARYLAND; ultrasound, computed tomography, body imaging
DUGOWSON, CARIN E.; MD, 1976, UNIVERSITY OF ILLINOIS; MPH, 1986, UNIVERSITY OF WASHINGTON; rheumatology
EUBANK, WILLIAM B.; MPH, 1986, TULANE UNIVERSITY; MD, 1986, TULANE UNIVERSITY; body MR and GU imaging
GILL, EDWARD A.; MD, 1984, UNIVERSITY OF WASHINGTON; cardiology
GILLESPIE, THURMAN; MD, 1980, THOMAS JEFFERSON UNIVERSITY; musculoskeletal radiology, orthopaedics
GLICKERMAN, DAVID J.; MD, 1983, ALBANY MEDICAL COLLEGE; angiography, interventional radiology
HOFFER, ERIC K.; MD, 1984, UNIVERSITY OF CALIFORNIA (LOS ANGELES); minimally invasive therapy, stent grafts for aneurysms, uterine artery embolization, dialysis access
LANGER, STEVE G.; PhD, 1994, OAKLAND UNIVERSITY; medical physics
LEWIS, DAVID H.; MD, 1985, VIRGINIA COMMONWEALTH UNIVERSITY; nuclear medicine
LINK, JEANNE; PhD, 1998, UNIVERSITY OF WASHINGTON; radioanalytical chemistry
MAKI, JEFFREY H.; MD, 1991, DUKE UNIVERSITY; MRI
MARGLIN, STEPHEN I.; MD, 1968, YALE UNIVERSITY; chest and oncologic radiology
OTT, SUSAN M.; MD, 1974, UNIVERSITY OF WASHINGTON; nephrology
PHILLIPS, LEON A.; MD, 1952, YALE UNIVERSITY; general radiology, uro-radiology.
RAJENDRAN, JOSEPH; MBBS, 1973, MADURAI UNIVERSITY (INDIA); MD, 1980, CHRISTIAN MEDICAL COLLEGE; nuclear medicine
ROSENBAUM, DAVID M.; MD, 1977, ALBERT EINSTEIN COLLEGE OF MEDICINE; pediatric radiology

SCHULTE, SCOTT J.; MD, 1979, UNIVERSITY OF WASHINGTON; gastrointestinal radiology
SZE, RAYMOND W.; MD, 1990, U OF MEDICINE & DENTISTRY OF NEW JERSEY; pediatrics
TAKASUGI, JULIE E.; MD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); pulmonary radiology
VESSELLE, HUBERT J.; PhD, 1990, CASE WESTERN RESERVE UNIVERSITY; nuclear medicine
WISEMAN, ROBERT W.; PhD, 1988, FLORIDA STATE UNIVERSITY; cellular energetics, nmr spectroscopy, mitochondria, kinetics, gene expression, metabolism
ZHANG, MIQIN; PhD, 1998, UNIVERSITY OF CALIFORNIA (BERKELEY); Biomaterials, tissue engineering, BioMEMS, bionanotechnology, surface modification, drug delivery.

Research Associate Professor

GARDNER, JILL C.; PhD, 1981, DALHOUSIE UNIVERSITY (CANADA); computed image processing and analysis

Assistant Professor

BRITZ, GAVIN W.; MBBChir, 1987, UNIVERSITY OF WITWATERSRAND (S. AFRICA); Cerebral aneurysms and AVMs, Carotid disease, skull base tumors, cerebral vasospasm
BRONSTEIN, ANDREW D.; MD, 1984, HARVARD UNIVERSITY; neuroradiology.
DALY, CHARLES P.; MD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); angiography and interventional radiology
GROSS, JOEL A.; MD, 1990, UNIVERSITY OF CALIFORNIA (DAVIS); Emergency & Trauma Radiology, Body Imaging, Computers in Medicine, Medical Education & Training
JOHNSON, JANET A.; MD, 0, UNIVERSITY OF HAWAII; musculoskeletal imaging, chest, GI, CT, ultrasound.
KANAL, KALPANA M.; PhD, 1996, UNIVERSITY OF TEXAS (HOUSTON); Medical Physics, X-rays, Mammography, Radiation Dosimetry and Radiation Safety
LALANI, TASNEEM A.; MS, 1990, HARVARD UNIVERSITY; MD, 1993, UNIVERSITY OF ALBERTA (CANADA); CT/US/MRI
MERCCKER, JANIS M.; MD, 1976, UNIVERSITY OF WASHINGTON; pediatric radiology.
PALADIN, ANGELISA M.; MD, 1999, CHICAGO MEDICAL SCHOOL; pediatric radiology
SIDHU, MANRITA K.; MD, 1988, MEDICAL COLLEGE OF PENNSYLVANIA; pediatrics

Research Assistant Professor

ZHANG, SHANRONG; PhD, 1995, CHINESE ACADEMY OF SCIENCES (CHINA); Magnetic Resonance Imaging, Molecular Imaging, Lanthanide Chemistry, Responsive Contrast Agent, Shift Reagent

Rehabilitation Medicine

Professor

ANDERSON, MARJORIE E.; PhD, 1969, UNIVERSITY OF WASHINGTON; physiology of basal ganglia and thalamus; neural control of movement
BELL, KATHLEEN; MD, 1981, TEMPLE UNIVERSITY; brain injury and sleep disorders, community reintegration in brain injury, medical education
BENDITT, JOSHUA O.; MD, 1982, UNIVERSITY OF WASHINGTON; pulmonary and critical care medicine
BOMBARDIER, CHARLES H.; PhD, 1987, WASHINGTON STATE UNIVERSITY; spinal cord injury, brain injury, alcohol abuse after injury, psychological comorbidities
CZERNIECKI, JOSEPH M.; MD, 1981, UNIVERSITY OF BRITISH COLUMBIA (CANADA); MS, 1985, UNIVERSITY OF WASHINGTON; rehabilitation engineering, prosthetics, biomechanics and gait analysis
DE LATEUR, BARBARA J.; MD, 1963, UNIVERSITY OF WASHINGTON; psychiatry
DEITZ, JEAN L.; PhD, 1976, UNIVERSITY OF FLORIDA; occupational therapy, pediatrics, measurement
DIKMEN, SUREYYA S.; PhD, 1973, UNIVERSITY OF WASHINGTON; clinical neuropsychology, traumatic brain injury
ENGEL KNOWLES, JOYCE M.; PhD, 1988, UNIVERSITY OF KANSAS; use of occupational therapy, pain management with children and persons with physical disabilities
ESSELMAN, PETER C.; MD, 1986, UNIVERSITY OF WASHINGTON; exercise in the elderly; treatment of traumatic brain injury and burn rehabilitation
FORDYCE, WILBERT E.; PhD, 1953, UNIVERSITY OF WASHINGTON; psychology
FRASER, ROBERT T.; PhD, 1976, UNIVERSITY OF WISCONSIN; psychology.
GARDNER, GREGORY C.; MD, 1984, BAYLOR UNIVERSITY; rheumatology
GOLDSTEIN, BARRY; PhD, 1981, UNIVERSITY OF CALIFORNIA (LOS ANGELES); skin adaption to mechanical stress, pressure ulcers, overuse injuries of the upper extremity
GUY, ARTHUR W.; PhD, 1966, UNIVERSITY OF WASHINGTON; biological

- effects and medical applications of electromagnetic fields
- HALAR, EUGEN M.; MD, 1959, UNIVERSITY OF ZAGREB (YUGOSLAVIA); psychiatry
- HAMMOND, MARGARET C.; MD, 1979, MEDICAL COLLEGE OF WISCONSIN; medical consequences of longstanding spinal cord injury
- HAYS, ROSS M.; MD, 1978, UNIVERSITY OF WASHINGTON; pediatric rehabilitation, medical ethics, neuromuscular diseases, congenital defects
- HILLEL, ALLEN D.; MD, 1976, STANFORD UNIVERSITY; peripheral nerve physiology after injury, swallowing disorders in neuromuscular disease
- JAFFE, KENNETH M.; MD, 1975, HARVARD UNIVERSITY; pediatric rehabilitation, brain injury, neuromuscular diseases, congenital defects
- JENSEN, MARK; PhD, 1989, ARIZONA STATE UNIVERSITY; assessment and treatment of chronic pain, coping with medical illness, treatment outcome
- JOHNSON, KURT LEWIS; PhD, 1984, UNIVERSITY OF WISCONSIN; counseling psychology; psychological, social vocational aspects of disability and chronic illness
- KRAFT, GEORGE HOWARD; MD, 1963, OHIO STATE UNIVERSITY; psychiatry
- LEHMANN, JUSTUS F.; DrMed, 1945, JOHANN WOLFGANG GOETHE UNIV (GERMANY); psychiatry
- LITTLE, JAMES WENDELL; PhD, 1976, UNIVERSITY OF CHICAGO; rehabilitation medicine, clinical neurophysiology, spinal cord injury
- MASSAGLI, TERESA L.; MD, 1982, YALE UNIVERSITY; pediatric psychiatry
- PATRICK, DONALD L.; PhD, 1972, COLUMBIA UNIVERSITY; health status and quality of life, end of life, adolescents
- PATTERSON, DAVID R.; PhD, 1982, FLORIDA STATE UNIVERSITY; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma
- ROBINSON, LAWRENCE R.; MD, 1982, BAYLOR UNIVERSITY; psychiatry
- SHUMWAY-COOK, ANNE; PhD, 1983, UNIVERSITY OF OREGON; physiologic basis for balance problems following neurological injury
- SLIMP, JEFFERSON C.; PhD, 1976, UNIVERSITY OF WISCONSIN; clinical neurophysiology, intraoperative neuromonitoring, evoked potentials, deep-brain stimulation
- STOLOV, WALTER C.; MA, 1951, UNIVERSITY OF MINNESOTA; MD, 1956, UNIVERSITY OF MINNESOTA; psychiatry, electrodiagnostic medicine
- TEMKIN, NANCY R.; PhD, 1976, STATE UNIVERSITY OF NEW YORK (BUFFALO); clinical trials, recovery models, statistical modeling of epileptic phenomena, survival analysis.
- TURNER, JUDITH A.; PhD, 1979, UNIVERSITY OF CALIFORNIA (LOS ANGELES); psychology
- YORKSTON, KATHRYN; PhD, 1975, UNIVERSITY OF OREGON; neurogenic communication disorders in adults
- Associate Professor**
- BERNI, ROSEMARIAN; MN, 1973, UNIVERSITY OF WASHINGTON; rehabilitation nursing
- BRITELL, CATHERINE WOLLEAT; MD, 1973, UNIVERSITY OF SOUTHERN CALIFORNIA; chronic pain in spinal cord injury and development of new assistive technology for the work place
- BROCKWAY, JO A.; PhD, 1975, UNIVERSITY OF IOWA; behavioral medicine, clinical psychology, physical disability
- BURNS, STEPHEN P.; MD, 1992, BROWN UNIVERSITY; medical complications and neurologic recovery in spinal cord injury, whiplash, sleep apnea
- CHAN, LEIGHTON; MD, 1990, UNIVERSITY OF CALIFORNIA (LOS ANGELES); health service delivery related to Medicare patients
- CHANG, MICHAEL WEI; PhD, 1982, UNIVERSITY OF WASHINGTON; biomedical simulation, ultrasonography, electrophysiology, biomechanics
- DOCTOR, JASON N.; PhD, 1995, UNIVERSITY OF CALIFORNIA (SAN DIEGO); medical decision making, health economics, decision theory
- DUDGEON, BRIAN J.; PhD, 2000, UNIVERSITY OF WASHINGTON; occupational therapy, assistive technology, disability studies
- EHDE, DAWN; PhD, 1992, UNIVERSITY OF NORTH DAKOTA; chronic pain secondary to disability, psychological distress following disability
- FANN, JESSE R.; MD, 1989, NORTHWESTERN UNIVERSITY; MPH, 1995, UNIVERSITY OF WASHINGTON; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium
- GOLDBERG, MYRON; PhD, 1980, UNIVERSITY OF MIAMI (FLORIDA); neuropsychology, rehabilitation psychology, and neurologic rehabilitation
- GUTHRIE, MARK R.; PhD, 1990, UNIVERSITY OF WASHINGTON; functional assessment, physical therapy efficacy
- HASELKORN, JODIE K.; MD, 1985, LOUISIANA STATE UNIVERSITY; health services for the disabled: diagnostic accuracy of tests, effectiveness of interventions
- JAMES, JENNIFER J.; MD, 1994, UNIVERSITY OF VERMONT; spine, sports, and musculoskeletal medicine and rehabilitation
- KANNY, ELIZABETH M.; PhD, 1996, UNIVERSITY OF WASHINGTON; education of allied health practitioners; ethical reasoning and ethics education
- KARTIN, DEBORAH; PhD, 1996, UNIVERSITY OF WASHINGTON; developmental disabilities, prenatal drug exposure, high-risk infancy, postural development
- MC MILLAN, JO ANN; MEd, 1968, UNIVERSITY OF SOUTHERN CALIFORNIA; physical therapy.
- MILLER, ROBERT M.; PhD, 1976, UNIVERSITY OF WASHINGTON; speech, language pathology, adults, swallowing
- ODDERSON, IB R.; PhD, 1978, INDIANA UNIVERSITY; psychiatry, stroke, multiple sclerosis, spasticity, botulinum toxin
- PEPPING, MARY; PhD, 1981, WASHINGTON STATE UNIVERSITY; psychosocial outcome after TBI and mild TBI; neuropsychological features of dementia and mild TBI
- RODRIGUEZ, ARTHUR A.; MD, 1972, UNIVERSITY OF WISCONSIN; musculoskeletal pain disorders and clinical neurophysiology
- STIENS, STEVE A.; MD, 1986, UNIVERSITY OF CINCINNATI; MS, 1991, UNIVERSITY OF WASHINGTON; Spinal cord injury medicine, rehabilitation, neurogenic bowel care, spinal cord neuroplasticity
- Assistant Professor**
- DOWDEN, PATRICIA A.; PhD, 1993, UNIVERSITY OF WASHINGTON; augmentative communication, cleft palate
- GREENBERG, SHARON L.; MOT, 1978, UNIVERSITY OF WASHINGTON; occupational therapy
- HARNISS, MARK; PhD, 1996, UNIVERSITY OF OREGON; Using technology to improve the education of diverse learners.
- HOFFMAN, JEANNE MARIE; PhD, 2000, ARIZONA STATE UNIVERSITY; Rehabilitation Psychology
- POWELL, JANET M.; PhD, 2001, UNIVERSITY OF WASHINGTON; vision, perception, and cognition following brain injury; rehabilitation outcomes
- QUESTAD, KENT A.; PhD, 1982, UNIVERSITY OF WISCONSIN; rehabilitation counseling, psychology.
- SHERMAN, JEFFREY J.; PhD, 1998, UNIVERSITY OF KENTUCKY; Etiology, maintenance and treatment of chronic pain Posttraumatic stress disorder
- WEISS, MICHAEL D.; MD, 1991, ALBERT EINSTEIN COLLEGE OF MEDICINE; EMG, EEG, neuropathology and neuromuscular disorders
- WILLIAMS, RHONDA M.; PhD, 1992, ARIZONA STATE UNIVERSITY; multiple sclerosis, amputation, brain injury, social support, adjustment, group-based interventions
- Lecturer**
- ABRAHAMSON, DANIEL C.; BS, 1998, UNIVERSITY OF WASHINGTON;

Prosthetics design for transtibial and transfemoral amputees
DRALLE, ALAN J; BS, 1968, UNIVERSITY OF WASHINGTON; prosthetics and orthotics
HERTLING, DARLENE; BS, 1956, UNIVERSITY OF CALIFORNIA (BERKELEY); physical therapy and manual therapy techniques
OKUMURA, RAMONA M.; BS, 1981, UNIVERSITY OF WASHINGTON; pediatric limb deficiency, upper extremity prosthetics, prosthetic biomechanics
WILLIAMS, MARCIA FRANCES; PhD, 2000, UNIVERSITY OF WASHINGTON; physical therapy
YAMANE, ANN; BS, 1976, UNIVERSITY OF WASHINGTON; prosthetics and orthotics

Surgery

Professor

ALDEA, GABRIEL S.; MD, 1981, COLUMBIA UNIVERSITY; cardiothoracic surgery
ANDERSON, BENJAMIN O.; MD, 1985, ALBERT EINSTEIN COLLEGE OF MEDICINE; oncology, general surgery
ASHBAUGH, DAVID G.; MD, 1957, OHIO STATE UNIVERSITY; thoracic surgery.
BYRD, DAVID R.; MD, 1982, TULANE UNIVERSITY; general surgery and oncology
CLOWES, ALEXANDER W; MD, 1972, HARVARD UNIVERSITY; vascular smooth muscle cell growth control arterial injury and repair
COPASS, MICHAEL K; MA, 1964, NORTHWESTERN UNIVERSITY; MD, 1964, NORTHWESTERN UNIVERSITY; neurology/emergency services
DEAN, LARRY S.; MD, 1980, UNIVERSITY OF ALABAMA; cardiology
DELLINGER, E PATCHEN; MD, 1970, HARVARD UNIVERSITY; general and gastrointestinal surgery
ENGRAV, LOREN H; MD, 1969, UNIVERSITY OF CALIFORNIA (LOS ANGELES); plastic and reconstructive surgery.
FOY, HUGH M; MD, 1978, UNIVERSITY OF NEBRASKA; general surgery.
GIBRAN, NICOLE; MD, 1985, BOSTON UNIVERSITY; general, burn, and trauma surgery
GOFF, BARBARA A.; MD, 1986, UNIVERSITY OF PENNSYLVANIA; gynecologic oncology
GRUSS, JOSEPH S.; MBChB, 1969, UNIVERSITY OF WITWATERSRAND (S. AFRICA); craniofacial and maxillofacial surgery
HANEL, DOUGLAS PAUL; MD, 1977, ST LOUIS UNIVERSITY; orthopaedics, hand/microvascular surgery
HATSUKAMI, THOMAS; MD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); vascular surgery.
HEIMBACH, DAVID M; MD, 1964, CORNELL UNIVERSITY; burn and general surgery.
HERMAN, CLIFFORD M; MD, 1959, UNIVERSITY OF VERMONT; general surgery.
ISIK, F. FRANK; MD, 1985, MT SINAI SCHOOL OF MEDICINE; plastic surgery/control of angiogenesis
JOHANSEN, KAJ H; PhD, 1977, UNIVERSITY OF CALIFORNIA (SAN DIEGO); general and vascular surgery.
JONES, ROBERT F; MD, 1952, UNIVERSITY OF TEXAS (SOUTHWESTERN); oncology and general surgery.
JURKOVICH, GREGORY J.; MD, 1978, UNIVERSITY OF MINNESOTA; general surgery.
KOHLE, TED R; MD, 1976, HARVARD UNIVERSITY; general and vascular surgery.
MAIER, RONALD V; MD, 1973, DUKE UNIVERSITY; general surgery, trauma-critical care surgery
MERENDINO, K ALVIN; PhD, 1946, UNIVERSITY OF MINNESOTA; general surgery
MILLER, DONALD W; MD, 1965, HARVARD UNIVERSITY; meticulous practice of cardiac surgery, including risk assessment & postoperativeintensivecare mngmt
MOCK, CHARLES N.; MD, 1980, BROWN UNIVERSITY; injury: epidemiology, prevention, treatment; especially in less-developed countries
MOE, ROGER E; MD, 1959, UNIVERSITY OF WASHINGTON; oncology and general surgery.
PATTERSON, DAVID R.; PhD, 1982, FLORIDA STATE UNIVERSITY; treatment of acute pain, psychology of burn patients, psychological outcome of physical trauma
PELLEGRINI, CARLOS A.; MD, 1971, UNIV OF ROSARIO MED SCHOOL (ARGENTINA); general and laparoscopic surgery
PERKINS, JAMES D.; MD, 1979, UNIVERSITY OF ARKANSAS; transplant surgery.
SATAVA, RICHARD M.; MD, 1968, HAHNEMANN MEDICAL COLLEGE; MS, 1972, MAYO MEDICAL SCHOOL/GRADUATE SCHOOL; Gastrointestinal surgery, robotics, surgical education, training and simulation, virtual reality
SAWIN, ROBERT; MD, 1982, UNIVERSITY OF PITTSBURGH; pediatric surgery.
SINANAN, MIKA N.; PhD, 1986, UNIVERSITY OF BRITISH COLUMBIA (CANADA); Surgical education, biorobotic surgical instrument development, and clinical procedure development
TRUMBLE, THOMAS E.; MD, 1979, YALE UNIVERSITY; orthopaedics, hand and microvascular surgery
VEDDER, NICHOLAS; MD, 1981, CASE WESTERN RESERVE UNIVERSITY; case history, plastic and reconstructive surgery.
VERRIER, EDWARD D.; MD, 1974, TUFTS UNIVERSITY; cardiothoracic surgery.
WALDHAUSEN, JOHN H.; MD, 1986, PENNSYLVANIA STATE UNIVERSITY; pediatric surgery
WINTERSCHIED, LOREN C; PhD, 1953, UNIVERSITY OF PENNSYLVANIA; general and thoracic surgery.
WOOD, DOUGLAS E.; MD, 1983, HARVARD UNIVERSITY; thoracic surgery.
YEUNG, RAYMOND S.; MD, 1982, UNIVERSITY OF TORONTO (CANADA); general and surgical oncology
ZIERLER, ROBERT; MD, 1976, JOHNS HOPKINS UNIVERSITY; general and vascular surgery.

Research Professor

BEACH, KIRK WATSON; PhD, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); arterial disease in diabetes, blood flow studies with ultrasonic Doppler
WINN, ROBERT K.; PhD, 1974, UNIVERSITY OF WASHINGTON; pulmonary physiology, neutrophil immigration and monoclonal antibody

Associate Professor

ALLAN, CHRISTOPHER H; MD, 1992, NORTHWESTERN UNIVERSITY; hand and microvascular surgery
COHEN, GORDON A.; PhD, 1996, UNIVERSITY OF CALIFORNIA (LOS ANGELES); cardiovascular biology & pharmacology, neonatal repairs, pediatric heart/lung transplantation
EGBERT, MARK A; DDS, 1981, UNIVERSITY OF WASHINGTON; oral and maxillofacial surgery.
FLUM, DAVID R; MD, 1991, UNIVERSITY OF MIAMI (FLORIDA); improving surgical care quality in the community at large, identifying & promoting "best" practices"
HEALEY, PATRICK J.; MD, 1987, BOSTON UNIVERSITY; general and pediatric surgery
HORVATH, KAREN D.; MD, 1990, NEW YORK MEDICAL COLLEGE; surgical critical care, laparoscopic surgery
KUHR, CHRISTIAN S.; MD, 1988, UNIVERSITY OF WASHINGTON; multi-organ transplantation, urologic surgery
LANGDALE, LORRIE A.; MD, 1979, UNIVERSITY OF WASHINGTON; general surgery.
LYNGE, DANA C.; MD, 1985, MCGILL UNIVERSITY (CANADA); general surgery
MEISSNER, MARK H.; MD, 1985, UNIVERSITY OF COLORADO (DENVER); general, vascular, and critical care surgery

MULLIGAN, MICHAEL S.; MD, 1989, UNIVERSITY OF CONNECTICUT; thoracic surgery
NICHOLLS, STEPHEN C.; MBChB, 1975, UNIVERSITY OF AUCKLAND (NEW ZEALAND); vascular surgery
OELSCHLAGER, BRANT K.; MD, 1995, UNIVERSITY OF NORTH CAROLINA; minimally invasive surgery, esophageal surgery, bariatric surgery, gastro-intestinal surgery
O'KEEFE, GRANT E.; MD, 1988, UNIVERSITY OF ALBERTA (CANADA); Pathophysiology of post-injury infection and organ failure
PERMUT, LESTER C.; MD, 1983, BOSTON UNIVERSITY; Neonatal myocardial protection, peds cardiothoracic surgery, neonatal repairs, peds heart trnspltn
ZIERLER, BRENDA; PhD, 1996, UNIVERSITY OF WASHINGTON; research in patient with venous thromboembolism; clinical outcomes, process outcomes

Research Associate Professor

DAUM, GUENTER; PhD, 1989, UNIVERSITY OF KONSTANZ (GERMANY); cellular and molecular biology, tryosine phosphotase and kinases

Assistant Professor

BAKTHAVATSALAM, RAMASAMY; MS, 1988, UNIVERSITY OF MADRAS (INDIA); kidney, pancreas and liver transplantation, complex uro-oncology, vascular access
BARR, DARLENE; MD, 0, UNIVERSITY OF ALABAMA; transplant surgery
CAINE, WILLIAM T.; MD, 1993, UNIVERSITY OF UTAH; Adult coronary artery and valve surgery, arrhythmia surgery, and study of heart surgery outcomes
KING, ROBERT C.; MD, 1993, UNIVERSITY OF PENNSYLVANIA; Adult & Minimally invasive cardiac surgery. Community outreach programs. Cost & outcome analysis
LEVY, ADAM E.; MD, 1990, UNIVERSITY OF CINCINNATI; transplant
SALERNO, CHRISTOPHER T.; MD, 1992, RUSH MEDICAL COLLEGE; Adult cardiac surgery including cardiac transplantation and cardiac assist devices

Research Assistant Professor

HOCKING, ANNE MAREE; PhD, 1994, UNIVERSITY OF MELBOURNE (AUSTRALIA); Cell signaling in skin
LI, WEI; PhD, 1999, NORMAN BETHUNE UNIVERSITY (CHINA); Transplant immunologist and microsurgeon
WIJELATH, ERROL S.; PhD, 1989, UNIVERSITY OF STRATHCLYDE (UK); Extracellular matrix and growth factor interaction in vascular biology

Urology

Professor

ANSELL, JULIAN S.; PhD, 1959, UNIVERSITY OF MINNESOTA; congenital defects and pediatric urology
BARNES, GLOVER W.; PhD, 1961, STATE UNIVERSITY OF NEW YORK (BUFFALO); tissue, organ immunology
BRANNEN, GEORGE; MD, 1969, NORTHWESTERN UNIVERSITY; general adult urology, third-world medicine
CHAPMAN, WARREN H.; MD, 1952, UNIVERSITY OF CHICAGO; oncology and microsurgery
ELLIS, WILLIAM J.; MD, 1985, JOHNS HOPKINS UNIVERSITY; oncology, prostate disease
KRIEGER, JOHN N.; MD, 1974, CORNELL UNIVERSITY; infectious diseases
LANGE, PAUL HENRY; MD, 1967, WASHINGTON UNIVERSITY; oncology, endourology and adult reconstruction
MITCHELL, MICHAEL E.; MD, 1969, HARVARD UNIVERSITY; pediatric urology and reconstruction
VESSELLA, ROBERT L.; PhD, 1974, UNIVERSITY OF MISSISSIPPI; tumor markers and immunology
WESSELLS, HUNTER; MD, 1988, GEORGETOWN UNIVERSITY; ganitourinary trauma, reconstructive surgery

Associate Professor

BURNS, MARK W.; MD, 1979, UNIVERSITY OF WASHINGTON; pediatric urology and transplantation.
GRADY, RICHARD W.; MD, 1990, UNIVERSITY OF MICHIGAN; pediatric urology

HIGANO, CELESTIA S.; MD, 1979, UNIVERSITY OF MASSACHUSETTS; oncology
JOYNER, BYRON DAVID; MD, 1988, HARVARD UNIVERSITY; pediatric urology
KUHR, CHRISTIAN S.; MD, 1988, UNIVERSITY OF WASHINGTON; multi-organ transplantation, urologic surgery
MILLER, JANE L.; MD, 1985, UNIVERSITY OF OKLAHOMA; female urology and urodynamics, urologic trauma
PORTER, JAMES ROSCOE; MD, 1990, MEDICAL COLLEGE OF OHIO; urologic trauma, laparoscopy, endourology
TAKAYAMA, THOMAS K.; MD, 1985, TUFTS UNIVERSITY; biochemistry of prostate specific antigen
YANG, CLAIRE C.; MD, 1988, VANDERBILT UNIVERSITY; neurourology and electrophysiology testing

Research Associate Professor

COREY, EVA; PhD, 1989, ACADEMY OF SCIENCE (USSR); bone metastasis, detection by RT-PCR, markers of progression, prostate specific antigen
LIU, ALVIN Y.; PhD, 1981, UNIVERSITY OF CALIFORNIA (LOS ANGELES); cell biology, cancer, gene expression
RILEY, DONALD E.; PhD, 1976, UNIVERSITY OF WASHINGTON; pathogenic research and diagnosis involving DNA sequences

Assistant Professor

BAKTHAVATSALAM, RAMASAMY; MS, 1988, UNIVERSITY OF MADRAS (INDIA); kidney, pancreas and liver transplantation, complex uro-oncology, vascular access
CORMAN, JOHN M.; MD, 1992, BAYLOR UNIVERSITY; general surgery
LIN, DANIEL W.; MA, 1994, VANDERBILT UNIVERSITY; Urologic oncology, prostate cancer molecular biology

Lecturer

MULLER, CHARLES; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); male fertility and sperm physiology

School of Nursing

Professor

- BARNARD, KATHRYN E.; PhD, 1972, UNIVERSITY OF WASHINGTON; ecological factors of child development
- BATEY, MARJORIE V.; PhD, 1968, UNIVERSITY OF COLORADO (BOULDER); sociological factors in health-care systems
- BERKOWITZ, BOBBIE; PhD, 1990, CASE WESTERN RESERVE UNIVERSITY; administration, leadership and policy development within public health and nursing
- BERRY, DONNA L.; PhD, 1992, UNIVERSITY OF WASHINGTON; health care of persons with, and at risk for, cancer
- BLACKBURN, SUSAN T.; PhD, 1979, UNIVERSITY OF WASHINGTON; high-risk infants and their families, infant care-giving interactions and environments
- BOND, ELEANOR; PhD, 1985, UNIVERSITY OF WASHINGTON; acute care and critical care nursing, gut motility, effect of ovarian hormones on GI track, stress
- BOOTH-LAFORCE, CATHRYN L.; PhD, 1974, OHIO STATE UNIVERSITY; mother-infant interaction, observational methodology, child birth experiences and attachment
- BRANDT, PATRICIA; PhD, 1981, UNIVERSITY OF WASHINGTON; influence of family functioning on early child development
- BROWN, MARIE ANNETTE; PhD, 1983, UNIVERSITY OF WASHINGTON; womens health, depression, mood disorders, lifestyle changes, exercise, and loss/grief/dying
- BUDZYNSKI, HELEN KOGAN; PhD, 1968, UNIVERSITY OF CALIFORNIA (LOS ANGELES); stress response: cognitive/physiologic interface in chronic dysfunctions, self-management teaching
- BUTTERFIELD, PATRICIA G.; PhD, 1992, OREGON HEALTH SCIENCES UNIVERSITY; occupational & environmental health, public health nursing leadership
- CHRISMAN, NOEL J.; PhD, 1966, UNIVERSITY OF CALIFORNIA (BERKELEY); health beliefs and practices, social networks and social support; clinically applied anthropology
- COWAN, MARIE J.; PhD, 1979, UNIVERSITY OF WASHINGTON; estimation of infarct size by electrocardiography, sudden cardiac death, physiological nursing
- CRAVEN, RUTH F.; MN, 1968, UNIVERSITY OF WASHINGTON; EdD, 1984, SEATTLE UNIVERSITY; gerontological nursing
- CUNNINGHAM, SUSANNA L.; PhD, 1978, UNIVERSITY OF WASHINGTON; risk factors for atherosclerotic cardiovascular disease
- CURTIS, JARED R.; MD, 1988, JOHNS HOPKINS UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; pulmonary diseases and critical care medicine
- DE TORNYAY, RHEBA; EdD, 1967, STANFORD UNIVERSITY; health services, nursing education
- DIMOND, MARGARET; PhD, 1978, UNIVERSITY OF WISCONSIN; aging, bereavement, family caregiving, Alzheimer's disease, chronic illness, long-term care
- EGGERT, LEONA; PhD, 1984, UNIVERSITY OF WASHINGTON; adolescents, drug use, suicide, communication, personal relationships
- EYRES, SANDRA J.; PhD, 1972, UNIVERSITY OF NORTH CAROLINA; environmental resources promoting adaptation and health
- GALLUCCI, BETTY J.; PhD, 1973, NORTH CAROLINA STATE UNIVERSITY; oncology, nutritional assessment, pathophysiology of stomatitis, and graft versus host disease
- GRAHAM, KATHERINE YOUNG; PhD, 1978, UNIVERSITY OF WASHINGTON; family adaptation; quality of life in wellness and illness; professional commitment
- HABERMAN, MEL R.; PhD, 1987, UNIVERSITY OF WASHINGTON; quality of life of cancer survivors, impact of breast cancer on family
- HEGYVARY, SUE T.; PhD, 1974, VANDERBILT UNIVERSITY; administration and productivity of health care and nursing services
- HEITKEMPER, MARGARET M.; PhD, 1981, UNIVERSITY OF ILLINOIS; gastroenterology, enteral nutrition, gerontology
- HORN, BARBARA J.; PhD, 1971, UNIVERSITY OF MICHIGAN; effective organization of nursing resources
- KIECKHEFER, GAIL M.; PhD, 1985, UNIVERSITY OF WASHINGTON; motivation for health promotional and illness management behavior in children
- KILLIEN, MARCIA G.; PhD, 1982, UNIVERSITY OF WASHINGTON; women's health, reproductive decision making, work and family
- KODADEK, SHEILA M.; PhD, 1985, UNIVERSITY OF ILLINOIS; population-based nursing
- LANDIS, CAROL A.; MS, 1973, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); DNS, 1988, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); health consequences of sleep loss, neuroendocrinimmune interactions, methods of inquiry
- LEWIS, FRANCES M.; PhD, 1977, STANFORD UNIVERSITY; complex organizational analysis, evaluation research, psychosocial factors in chronic illness
- MAGYARY, DIANE L.; PhD, 1981, UNIVERSITY OF WASHINGTON; family centered health care of children at risk, disabled or handicapped
- MITCHELL, PAMELA H.; PhD, 1991, UNIVERSITY OF WASHINGTON; neuroscience nursing, diagnostic strategies
- MURPHY, SHIRLEY ANN; PhD, 1981, PORTLAND STATE UNIVERSITY; addictive processes in women, coping with undesirable life events
- OSBORNE, OLIVER H.; PhD, 1968, MICHIGAN STATE UNIVERSITY; ideology, policy and health-care systems, cross-cultural health, mental health, nursing
- PATRICK, MAXINE L.; DPH, 1970, UNIVERSITY OF CALIFORNIA (LOS ANGELES); gerontology, geriatrics
- PRICE SPRATLEN, LOIS; PhD, 1976, UNIVERSITY OF WASHINGTON; sexual harrasment and perceived workplace mistreatment in higher education
- SALAZAR, MARY K.; PhD, 1991, SEATTLE UNIVERSITY; behavioral theory applied to health education, occupational health, program evaluation
- SIANTZ, MARY LOU; PhD, 1984, UNIVERSITY OF MARYLAND; child/adolescent psychiatric nursing, risk and adaptation among migrant children and families
- SPIEKER, SUSAN J.; PhD, 1982, CORNELL UNIVERSITY; developmental psychology, infant security, mother-infant interaction
- SWANSON, KRISTEN M.; PhD, 1983, UNIVERSITY OF COLORADO (BOULDER); caring therapeutics, responses to miscarriage, women's health, loss, bereavement.
- TERI, LINDA; PhD, 1980, UNIVERSITY OF VERMONT; conrolled clinical trials of caregiving training for patients with Alzheimers
- THOMAS, KAREN A.; PhD, 1986, UNIVERSITY OF WASHINGTON; preterm infant development, care unit environments, acute care pediatrics, thermoregulation
- THOMPSON, FRANCES ELAINE A.; PhD, 1990, UNIVERSITY OF WASHINGTON; attribution theory, adolescent drug use, suicide
- VITIELLO, MICHAEL V.; PhD, 1980, UNIVERSITY OF WASHINGTON; Sleep, sleep disorders, circadian rhythms, aging, behavioral medicine
- WHITNEY, JOANNE D.; PhD, 1991, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); wound healing
- WILKIE, DIANA J.; PhD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); cancer pain assessment and management, pain research

WOLF-WILETS, VIVIAN; PhD, 1969, UNIVERSITY OF CHICAGO; curriculum development, instruction, stress management
WOODS, NANCY; PhD, 1978, UNIVERSITY OF NORTH CAROLINA; women's health
WOODS, SUSAN L.; PhD, 1991, OREGON HEALTH SCIENCES UNIVERSITY; cardiovascular clinical specialist, pulmonary artery catheter measurement

Research Professor

BEATON, RANDAL D.; PhD, 1972, UNIVERSITY OF WASHINGTON; assessment and treatment of temporomandibular joint pain and dysfunction
KELLY, JEAN F.; PhD, 1979, UNIVERSITY OF WASHINGTON; family factors that affect at-risk children
LENTZ, MARTHA J.; PhD, 1984, UNIVERSITY OF WASHINGTON; physiological adaptation: the influence of sleep and other biological rhythms

Associate Professor

ALTMAN, GAYLENE M.; PhD, 1992, UNIVERSITY OF WASHINGTON; women's health and inflammation; pain and endometriosis
BELZA, BASIA; PhD, 1991, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); chronic illness, gerontology, fatigue prevention and management in rheumatic diseases
BETRUS, PATRICIA; PhD, 1985, UNIVERSITY OF WASHINGTON; women and depression, epigenesis of emotions, mental health, stress, violence quantitative analysis
BEVENS, STELLA H.; MA, 1951, UNIVERSITY OF MINNESOTA; physiological nursing
BLAINEY, CAROL; MN, 1967, UNIVERSITY OF WASHINGTON; clinical teaching and problems of patients with diabetes mellitus
BRANDT, EDNA M.; MN, 1953, UNIVERSITY OF WASHINGTON; physiological nursing
CARR, CATHERINE A.; PhD, 1993, UNIVERSITY OF MICHIGAN; factors that affect provider practice and clinical outcomes of midwifery care
COCHRANE, BARBARA B.; PhD, 1992, UNIVERSITY OF WASHINGTON; women's health; individual adaptations to health and illness, clinical therapeutics
ENSGN, B. JOSEPHINE; MS, 1986, VIRGINIA COLLEGE OF MEDICINE; MPH, 1992, JOHNS HOPKINS UNIVERSITY; DPH, 1994, JOHNS HOPKINS UNIVERSITY; health care program planning and evaluation for marginalized populations and high-risk youth
ESTES, NADA; MS, 1958, UNIVERSITY OF COLORADO (BOULDER); counseling people with substance-use disorder, depression

FLAGLER, SUSAN B.; DNS, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); maternal role adjustment and early parent-infant interaction
HOFFMAN, AGNES; PhD, 1977, UNIVERSITY OF KANSAS; substance use disorders, mental health care of the elderly
HORN, BEVERLY M.; PhD, 1975, UNIVERSITY OF WASHINGTON; cross-cultural research in maternal-child nursing
HUEBNER, COLLEEN ELLEN; PhD, 1991, UNIVERSITY OF WASHINGTON; the social bases of developmental problems in early childhood
JARRETT, MONICA E.; PhD, 1988, UNIVERSITY OF WASHINGTON; psychobiology of women
JORDAN, PAMELA L.; PhD, 1984, UNIVERSITY OF MICHIGAN; expectant/new fatherhood, transition to parenthood
KANG, REBECCA R.; PhD, 1985, UNIVERSITY OF WASHINGTON; environment of at-risk infants and families, Asian and Pacific Islander health
LEPPA, CAROL J.; PhD, 1990, UNIVERSITY OF ILLINOIS; Ethics and comparative health care systems, palliative care approaches to end of life care, chronic
LEWIS, LINDA L.; PhD, 1987, UNIVERSITY OF ILLINOIS; reproductive neuroendocrinology mood changes related to the human menstrual cycle
LINDENBERG, CATHERINE S.; DPH, 1985, JOHNS HOPKINS UNIVERSITY; public health management and policy
LYDON-ROCHELLE, MONA; PhD, 1999, UNIVERSITY OF WASHINGTON; applied epidemiology in maternal health
MEYER, KERRY E.; PhD, 1990, UNIVERSITY OF MARYLAND; Health informatics, expert systems in support of clinical decision making, and geriatrics
MITCHELL, ELLEN S.; PhD, 1986, UNIVERSITY OF WASHINGTON; women's health; menstrual cycle symptom experience, food cravings and eating control
MOTZER, SANDRA ADAMS; PhD, 1992, OREGON HEALTH SCIENCES UNIVERSITY; NK cell function in women with chronic health disturbance (i.e., irritable bowel syndrome)
MUNET-VILARO, FRANCES; PhD, 1984, UNIVERSITY OF WASHINGTON; Coping of Latinos with a family member with cancer and/or AIDS.
O'CONNOR, FREDERICA W.; PhD, 1986, NORTHWESTERN UNIVERSITY; public sector mental health treatment provision, interventions promoting desired life quality
OLSHANSKY, ELLEN F.; DNS, 1985, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); psychosocial implications of infertility related to the family, qualitative research, depression
SCHEPP, KAREN G.; PhD, 1985, UNIVERSITY OF ARIZONA; stress and coping of

physically and mentally ill youth and their families
SCHROEDER, CAROLE A.; PhD, 1993, UNIVERSITY OF COLORADO (DENVER); women's health experiences, critical approaches to knowledge development, and developing partnership
SCHULTZ, PHYLLIS R.; PhD, 1981, UNIVERSITY OF DENVER; nursing systems research, impact of nursing services on population's health
SCHWARTZ, ANNA L.; PhD, 1997, UNIVERSITY OF UTAH; Exercise and cancer. Cancer-related fatigue, symptom management, health promotion, instrumentation
SHANNON, SARAH E.; PhD, 1992, UNIVERSITY OF WASHINGTON; clinical ethics; decision-making surrounding use of life-sustaining therapies
SIKMA, SUZANNE; PhD, 1994, UNIVERSITY OF WASHINGTON; caring in organizations, development and evaluation of organizations, care delivery systems
SIMPSON, TERRI A.; PhD, 1988, UNIVERSITY OF WASHINGTON; critical care patients' physiological and psychological responses to environmental stressors
SPITZER, ADA; PhD, 1990, UNIVERSITY OF WASHINGTON; migration, cross-cultural nursing, stress and coping of children with illness, nursing scholarship
WHITE-TRAUT, ROSEMARY; DSc, 1983, RUSH UNIVERSITY; preterm infant physiological and behavioral responsiveness to multimodal stimulation by caregivers
YOUNG, HEATHER M.; PhD, 1991, UNIVERSITY OF WASHINGTON; community based health care service for older adults
ZIERLER, BRENDA; PhD, 1996, UNIVERSITY OF WASHINGTON; research in patient with venous thromboembolism; clinical outcomes, process outcomes

Research Associate Professor

BURR, ROBERT L.; PhD, 1986, UNIVERSITY OF WASHINGTON; cardiovascular/psychophysiology, autonomic nervous system
DOUGHERTY, CYNTHIA M.; PhD, 1990, UNIVERSITY OF WASHINGTON; cardiovascular disease, sudden cardiac death, nursing interventions, cardiovascular risk modification
HERTING, JERALD R.; PhD, 1987, UNIVERSITY OF WASHINGTON; research methodology and at-risk youth
JOHNSON, LEONARD CLARK; PhD, 1978, UNIVERSITY OF WASHINGTON; applied research methods including development in applied statistics, assessment, and analysis
LOGSDON, REBECCA G.; PhD, 1986, OKLAHOMA STATE UNIVERSITY;

geriatric psychology, Alzheimer's disease, caregiving
LOVELL, DAVID GILBERT; MSW, 1993, UNIVERSITY OF WASHINGTON; criminal justice policy and treatment of mentally ill offenders.
MCCURRY, SUSAN MELANCON; PhD, 1991, UNIVERSITY OF NEVADA; dementia, aging, older adults, depression, sleep, psychotherapy intervention research
MCGRATH, BARBARA B.; PhD, 1993, UNIVERSITY OF WASHINGTON; ethnographic studies with U.S. Pacific Islanders on health issues, specifically, HIV/AIDS prevention
RANDELL, BROOKE P.; MN, 1969, UNIVERSITY OF CALIFORNIA (LOS ANGELES); DNursSci, 1987, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); preventive community-based interventions with high-risk adolescents and their families.

Assistant Professor

BAKER, MARGARET W; PhD, 2000, UNIVERSITY OF WASHINGTON; Independence and older Americans; elder mistreatment
DRAYE, MARY A.; MPH, 1968, UNIVERSITY OF MICHIGAN; primary health care, health promotion, risk appraisal, coping with infertility
KENNEDY, MICHAEL; PhD, 1994, UNIVERSITY OF WASHINGTON; symptom self-management, clinical nursing research
KOZUKI, YORIKO; PhD, 1999, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); adherence to psychotropic medications in populations with schizophrenia spectrum disorders
KURTH, ANN E.; PhD, 2003, UNIVERSITY OF WASHINGTON; sexually transmitted infection screening & prevention; clinical epidemiology; applied informatics
LARSON, MARGARET L; MN, 1967, UNIVERSITY OF WASHINGTON; cross-cultural variables in mental illness,

nursing interventions in disturbed behaviors
MACLAREN LORANGER, AILEEN; PhD, 1998, JOHNS HOPKINS UNIVERSITY; nurse midwifery
NGUYEN, HUONG Q; PhD, 2003, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); Self-management, chronic illness, Internet, interactive technology
OSHIO, SACHIKO; PhD, 1992, UNIVERSITY OF WASHINGTON; Nurse-Midwifery, Mother-Infant Relationship Development, Mental Representation of Relationship.
OYLER, MEL R.; PhD, 1997, UNIVERSITY OF WASHINGTON; database systems, technology strategy, commercial applications of information science
PRICE, MARTHA J.; DNS, 1988, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); self-management in chronic illness, diabetes mellitus, qualitative research methodologies
RICE, STEPHEN G; PhD, 1974, NEW YORK UNIVERSITY; sports medicine
SALES, ANNE; PhD, 1998, UNIVERSITY OF MINNESOTA; patient and organizational outcomes, health care work force, health economics
SOLCHANY, JOANNE E.; PhD, 2000, UNIVERSITY OF WASHINGTON; relationships between children and their primary caregivers
TYSON, SHERYL; PhD, 2002, UNIVERSITY OF CALIFORNIA (LOS ANGELES); Intimate Partner Violence Against Women
WALSH, ELAINE M.; PhD, 1999, UNIVERSITY OF WASHINGTON; Prevention of suicide and drug abuse among adolescents and young adults
WILD, LORIE M; PhD, 1996, UNIVERSITY OF WASHINGTON; clinical pain management

Research Assistant Professor

ARCHBOLD, KRISTEN H; PhD, 2001, UNIVERSITY OF MICHIGAN; Sleep and cognitive executive dysfunction
BOND, GAIL E; PhD, 1995, UNIVERSITY OF WASHINGTON; aging, memory, substance-use disorders, long-term care
CARRERE, SYBIL; PhD, 1990, UNIVERSITY OF CALIFORNIA (IRVINE); interface between family relationships, stress, and health

Lecturer

ACKER, MICHELE; MN, 1995, ARIZONA STATE UNIVERSITY; promoting good health for children, educating teens about healthy lifestyles-making positive choices
CHRISTIANSON, PHYLLIS L.; MN, 1990, UNIVERSITY OF WASHINGTON; gerontology
CORNMAN, BARBARA J; PhD, 1988, UNIVERSITY OF WASHINGTON; sexual assault victims, kinetic family drawings, family having child with cancer
HOYLE, CHRISTINE A; MN, 1979, UNIVERSITY OF WASHINGTON; primary health care
PIPES, PEGGY L; MA, 1952, COLUMBIA UNIVERSITY; MPH, 1966, UNIVERSITY OF MICHIGAN; maternal and child nutrition
WELTON, WILLIAM E.; MHA, 1972, UNIVERSITY OF MICHIGAN; DPH, 1999, UNIVERSITY OF MICHIGAN; strategic and organizational effectiveness of health systems

Instructor

AKER, SAUNDRA; BS, 1961, UNIVERSITY OF UTAH; medically optimal nutrition support for immunocompromised patients
TYLER, MARTHA L; MN, 1977, UNIVERSITY OF WASHINGTON; oxygenation during chest physiotherapy, suctioning, dyspnea, breathing patterns in disease
WILKINSON, KAREN; MN, 1990, UNIVERSITY OF WASHINGTON; pediatric nursing

College of Ocean and Fishery Sciences

Aquatic and Fishery Sciences

Professor

ARMSTRONG, DAVID A.; PhD, 1978, UNIVERSITY OF CALIFORNIA (DAVIS); crustean ecology and fisheries, estuarine habitat protection, impacts on dredging, pesticides

BOLTON, SUSAN M.; PhD, 1991, NEW MEXICO STATE UNIVERSITY; hydrology, watershed management, stream restoration, ecological engineering

BURGNER, ROBERT L.; PhD, 1958, UNIVERSITY OF WASHINGTON; salmon ecology and salmon biology

CHEW, KENNETH K.; PhD, 1962, UNIVERSITY OF WASHINGTON; shellfish biology and aquaculture; director, Western Regional Aquaculture Center

CONQUEST, LOVEDAY L.; PhD, 1975, UNIVERSITY OF WASHINGTON; statistics in forestry, fisheries, and environmental pollution monitoring

DICKHOFF, WALTON W.; PhD, 1976, UNIVERSITY OF CALIFORNIA (BERKELEY); fish physiology, endocrinology, aquaculture

ERICKSON, ALBERT; PhD, 1964, MICHIGAN STATE UNIVERSITY; wildlife biology and marine mammals

FRANCIS, ROBERT C.; PhD, 1970, UNIVERSITY OF WASHINGTON; fisheries management, marine ecosystem dynamics, fisheries oceanography and global climate change

GALLUCCI, VINCENT; PhD, 1971, NORTH CAROLINA STATE UNIVERSITY; stock assessment, fisheries management

GUNDERSON, DONALD R.; PhD, 1975, UNIVERSITY OF WASHINGTON; marine fisheries, stock assessment and recruitment processes

HALVER, JOHN E.; PhD, 1953, UNIVERSITY OF WASHINGTON; fundamental fish nutrition, physiology and metabolism, nutrients balance in field formulations

HILBORN, RAY; PhD, 1974, UNIVERSITY OF BRITISH COLUMBIA (CANADA); stock assessment, population dynamics, fisheries policy

HUPPERT, DANIEL D.; PhD, 1975, UNIVERSITY OF WASHINGTON; economics and management of natural resources, especially marine fisheries

KARR, JAMES; PhD, 1970, UNIVERSITY OF ILLINOIS; stream and watershed ecology, tropical forest ecology, conservation biology, environmental policy

KOCAN, RICHARD M.; PhD, 1967, MICHIGAN STATE UNIVERSITY; aquatic toxicology, fish toxicology, fish and wildlife diseases

LESCHINE, THOMAS M.; PhD, 1975, UNIVERSITY OF PITTSBURGH; marine

pollution management, ocean policy studies

LISTON, JOHN; PhD, 1955, UNIVERSITY OF ABERDEEN (UK); food science, marine microbiology

MATHEWS, STEPHEN B.; PhD, 1967, UNIVERSITY OF WASHINGTON; quantitative fishery management

MILES, EDWARD L.; PhD, 1965, UNIVERSITY OF DENVER; international law and organization; science, technology, and international relations; marine policy

MILLER, BRUCE S.; PhD, 1969, UNIVERSITY OF WASHINGTON; life history and ecology of marine fishes, especially early life history

MILLER, MARC; PhD, 1974, UNIVERSITY OF CALIFORNIA (IRVINE); maritime anthropology, cognitive anthropology and social/cultural change

NAIMAN, ROBERT J.; PhD, 1974, ARIZONA STATE UNIVERSITY; forest stream ecosystems, aquatic landscape dynamics

PIETSCH, THEODORE W.; PhD, 1973, UNIVERSITY OF SOUTHERN CALIFORNIA; systematic ichthyology, zoogeography, behavior, functional morphology, biotic survey

PIGOTT, GEORGE M.; PhD, 1963, UNIVERSITY OF WASHINGTON; food engineering

QUINN, THOMAS P.; PhD, 1981, UNIVERSITY OF WASHINGTON; fish behavior, ecology and evolution

SKALSKI, JOHN R.; PhD, 1985, CORNELL UNIVERSITY; population estimation, environmental statistics and sampling, effects assessment

SMITH, LYNWOOD S.; PhD, 1962, UNIVERSITY OF WASHINGTON; fish physiology

TAUB, FRIEDA B.; PhD, 1959, RUTGERS UNIVERSITY; ecology

UTTER, FRED M.; PhD, 1969, UNIVERSITY OF CALIFORNIA (DAVIS); Applied population genetics using molecular markers

WISSMAR, ROBERT C.; PhD, 1972, UNIVERSITY OF IDAHO; freshwater ecosystems, fish ecology, and trophic dynamics; river restoration

WOOSTER, WARREN S.; PhD, 1953, UNIVERSITY OF CALIFORNIA (SAN DIEGO); effects of climate change on marine ecosystems, use of scientific information in marine management

Research Professor

ANDERSON, JAMES J.; PhD, 1977, UNIVERSITY OF WASHINGTON; biomathematics, ecology, fisheries, oceanography, toxicology, fish protection at power plants

Associate Professor

BEAUCHAMP, DAVID A.; PhD, 1987, UNIVERSITY OF WASHINGTON; aquatic community ecology, bioenergetics, food web modeling, predator-prey, interactions, behavior

GRUE, CHRISTIAN E.; PhD, 1977, TEXAS A&M UNIVERSITY; wildlife toxicology, wildlife science

PARRISH, JULIA; PhD, 1988, DUKE UNIVERSITY; animal aggregation, fish schooling, seabirds, marine conservation, by catch

SCHINDLER, DANIEL E.; PhD, 1995, UNIVERSITY OF WISCONSIN; Ecosystem and community ecology - especially of aquatic systems.

VANBLARICOM, GLENN R.; PhD, 1978, UNIVERSITY OF CALIFORNIA (SAN DIEGO); marine wildlife, community ecology

Research Associate Professor

HERWIG, RUSSELL P.; PhD, 1989, UNIVERSITY OF WASHINGTON; environmental and applied aquatic microbiology, bioremediation-related microbiology

Assistant Professor

ESSINGTON, TIMOTHY E.; PhD, 1999, UNIVERSITY OF WISCONSIN; Fish and fisheries in marine food webs

Marine Affairs

Professor

ALVERSON, DAYTON L.; PhD, 1967, UNIVERSITY OF WASHINGTON; marine affairs

ARON, WILLIAM I.; PhD, 1960, UNIVERSITY OF WASHINGTON; management of living marine resources

CRUTCHFIELD, JAMES A.; PhD, 1954, UNIVERSITY OF CALIFORNIA (BERKELEY); natural resources economics, policy and management, especially marine and environmental resources

HERSHMAN, MARC; JD, 1967, TEMPLE UNIVERSITY; LL.M., 1970, UNIVERSITY OF MIAMI (FLORIDA); coastal zone management law

LESCHINE, THOMAS M.; PhD, 1975, UNIVERSITY OF PITTSBURGH; marine pollution management, ocean policy studies

MILES, EDWARD L.; PhD, 1965, UNIVERSITY OF DENVER; international law and organization; science, technology, and international relations; marine policy

WOOSTER, WARREN S.; PhD, 1953, UNIVERSITY OF CALIFORNIA (SAN DIEGO); effects of climate change on

marine ecosystems, use of scientific information in marine management

Associate Professor

- CANNING, DOUGLAS J; MS, 1987, EVERGREEN STATE COLLEGE; coastal zone management, public trust doctrine, global climate change and sea level rise
- COPPING, ANDREA; PhD, 1982, UNIVERSITY OF WASHINGTON; marine environment and water quality, marine science/marine policy
- DE MASTER, DOUGLAS PAUL; PhD, 1978, UNIVERSITY OF MINNESOTA; marine mammals, population dynamics, conservation biology
- DUXBURY, ALYN C; PhD, 1963, TEXAS A&M UNIVERSITY; estuarine processes and the management of human uses of these marine systems
- FLUHARTY, DAVID L; PhD, 1977, UNIVERSITY OF MICHIGAN; natural resource and environmental policy
- KACZYNSKI, WLODZIMIERZ M.; PhD, 1973, UNIVERSITY OF GDANSK (POLAND); fishery economics, international joint ventures in marine fisheries, international fisheries policy

Oceanography

Professor

- AAGAARD, KNUT; PhD, 1966, UNIVERSITY OF WASHINGTON; physical oceanography, ocean circulation, arctic oceanography
- ANDERSON, GEORGE C; PhD, 1954, UNIVERSITY OF WASHINGTON; plankton ecology, biological oceanography
- BAKER, EDWARD T; PhD, 1973, UNIVERSITY OF WASHINGTON; distribution, characterization, and impacts of hydrothermal emissions, linkage to tectonic processes
- BANSE, KARL; Doctorat d'Etat, 1955, UNIVERSITY OF KIEL (GERMANY); biological oceanography, plankton production and methodology, polychaete systematics
- BAROSS, JOHN A; PhD, 1973, UNIVERSITY OF WASHINGTON; microbial oceanography, bacterial ecology
- CANNON, GLENN A.; PhD, 1969, JOHNS HOPKINS UNIVERSITY; physical oceanography of coastal waters and deep-sea hydrothermal venting
- CREAGER, JOE S; PhD, 1958, TEXAS A&M UNIVERSITY; geological oceanography, sedimentology
- DELANEY, JOHN R.; PhD, 1977, UNIVERSITY OF ARIZONA; geological oceanography, origin of oceanic crust, igneous petrology
- DEMING, JODY W; PhD, 1981, UNIVERSITY OF MARYLAND; evolution and ecology of marine bacteria in the pressurized ocean
- DEVOL, ALLAN H; PhD, 1975, UNIVERSITY OF WASHINGTON; biogeochemistry, sediment diagenesis, anoxic systems, carbon fluxes
- EMERSON, STEVEN R.; PhD, 1974, COLUMBIA UNIVERSITY; marine geochemistry, chemical oceanography, sediment diagenesis
- ERIKSEN, CHARLES C; PhD, 1977, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; experimental physical oceanography; equatorial and upper ocean dynamics, internal waves
- EWART, TERRY E; PhD, 1965, UNIVERSITY OF WASHINGTON; physics, ocean microstructure, diffusion, acoustic transmission
- FEELY, RICHARD A; PhD, 1974, TEXAS A&M UNIVERSITY; chemical oceanography, oceanic sources and sinks for carbon dioxide
- GREGG, MICHAEL C; PhD, 1971, UNIVERSITY OF CALIFORNIA (SAN DIEGO); physical oceanography, ocean microstructure, coastal and estuarine processes, hydraulics, internal w
- HARRISON, DON EDMUNDS; PhD, 1977, HARVARD UNIVERSITY; ocean circulation modeling, air-sea interaction, ocean and climate dynamics
- HEATH, G ROSS; PhD, 1968, UNIVERSITY OF CALIFORNIA (SAN DIEGO); geochemistry and mineralogy of deep-sea sediments
- HICKEY, BARBARA M; PhD, 1975, UNIVERSITY OF CALIFORNIA (SAN DIEGO); physical oceanography, dynamics of equatorial and shelf circulation
- JOHNSON, GREGORY C; PhD, 1991, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; large-scale ocean circulation, dynamics and variability
- JOHNSON, HARLAN PAUL; PhD, 1972, UNIVERSITY OF WASHINGTON; paleomagnetism and marine geophysics
- KELLY, KATHRYN A.; PhD, 1983, UNIVERSITY OF CALIFORNIA (SAN DIEGO); physical oceanography, specializing in combining models with satellite observations.
- KESSLER, WILLIAM S; PhD, 1989, UNIVERSITY OF WASHINGTON; equatorial ocean circulation and waves; interannual climate variability
- KUNZE, ERIC L; PhD, 1985, UNIVERSITY OF WASHINGTON; mesoscale phenomena, wave/mean flow interaction double diffusion and mixing
- LEWIS, BRIAN T; PhD, 1970, UNIVERSITY OF WISCONSIN; marine geophysics, marine seismology, gravity, magnetics, and computer modeling of those processes
- LILLEY, MARVIN D.; PhD, 1983, OREGON STATE UNIVERSITY; chemical oceanography
- MARTIN, SEELYE; PhD, 1967, JOHNS HOPKINS UNIVERSITY; geophysical fluid dynamics, properties of sea ice
- MC DUFF, RUSSELL E; PhD, 1978, UNIVERSITY OF CALIFORNIA (SAN DIEGO); marine geochemistry
- MC MANUS, DEAN A; PhD, 1959, UNIVERSITY OF KANSAS; geological oceanography, continental shelf sediments, geoscience education
- MC PHADEN, MICHAEL J; PhD, 1980, SCRIPPS OCEANOGRAPHIC INSTITUTION; equatorial ocean dynamics, climate scale air-sea interaction
- MOBLEY, CURTIS D; PhD, 1977, UNIVERSITY OF MARYLAND; optical oceanography and radiative transfer, especially numerical modeling
- MOFJELD, HAROLD; PhD, 1970, UNIVERSITY OF WASHINGTON; tsunami dynamics, long waves and currents in the ocean, storm surge inundation
- MOORE, DENNIS W.; PhD, 1968, HARVARD UNIVERSITY; equatorial oceanography, geophysical fluid dynamics, and inertial boundary currents
- MORISON, JAMES H; PhD, 1980, UNIVERSITY OF WASHINGTON; upper ocean physical processes in the polar regions
- MURRAY, JAMES W; PhD, 1973, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; marine geochemistry, aquatic chemistry
- NITTROUER, CHARLES; PhD, 1978, UNIVERSITY OF WASHINGTON; geological oceanography, continental-margin sedimentation
- PERRY, MARY J.; PhD, 1974, UNIVERSITY OF CALIFORNIA (SAN DIEGO); biological oceanography, phytoplankton physiology, nutrient cycling
- QUAY, PAUL D; PhD, 1977, COLUMBIA UNIVERSITY; chemical oceanography, stable isotope geochemistry, ocean tracers and mixing
- RATTRAY, MAURICE; PhD, 1951, CALIFORNIA INSTITUTE OF TECHNOLOGY; physical oceanography, hydrodynamics, ocean circulation modeling
- RHINES, PETER B.; PhD, 1967, CAMBRIDGE UNIVERSITY (UK); the circulation of the oceans and evolution of climate
- RICHEY, JEFFREY E; PhD, 1973, UNIVERSITY OF CALIFORNIA (DAVIS); quantitative problems of aquatic ecosystems, primary Amazon River, limnology
- SANFORD, THOMAS B; PhD, 1967, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; physical oceanography, dynamics of ocean currents, motional induction, instrumentation
- SARACHIK, EDWARD; PhD, 1966, BRANDEIS UNIVERSITY; atmospheric dynamics, air-sea interactions, greenhouse warming, equatorial dynamics, climate change
- SPINDEL, ROBERT C.; PhD, 1971, YALE UNIVERSITY; ocean acoustics, signal

processing, acoustic navigation systems, acoustic tomography
STERNBERG, RICHARD; PhD, 1965, UNIVERSITY OF WASHINGTON; geological oceanography, marine sedimentation processes
WILCOCK, WILLIAM S D; PhD, 1992, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; marine seismology, dynamics of mid-ocean ridges, geological fluid dynamics

Research Professor

HOLMES, MARK L.; PhD, 1975, UNIVERSITY OF WASHINGTON; estuarine geologic processes, natural hazards in Puget Sound, crustal evolution at mid-ocean ridges

Associate Professor

ARMBRUST, E. VIRGINIA; PhD, 1990, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; molecular ecology, genetic diversity of microbial populations, diatom sexual reproduction
BALISTRERI, LAURIE S; MS, 1977, UNIVERSITY OF WASHINGTON; aqueous and environmental geochemistry, processes controlling trace elements in aquatic systems
BULLISTER, JOHN L; PhD, 1984, UNIVERSITY OF CALIFORNIA (SAN DIEGO); chemical tracers of large-scale ocean circulation and mixing, gases in the ocean and atmosphere
BUTTERFIELD, DAVID A.; PhD, 1990, UNIVERSITY OF WASHINGTON; geochemical systematics of hydrothermal fluids, relation to seafloor volcanism, microbial activity
CRONIN, MEGHAN; PhD, 1993, UNIVERSITY OF RHODE ISLAND; upper-ocean heat, salt, and momentum balances, western boundary currents, eddy-mean flow interaction
DUXBURY, ALYN C; PhD, 1963, TEXAS A&M UNIVERSITY; estuarine processes and the management of human uses of these marine systems
GRUNBAUM, DANIEL; PhD, 1991, CORNELL UNIVERSITY; zooplankton

ecology, population biology, behavioral ecology, mathematical biology, and biomechanics
HOLCOMB, ROBIN T.; PhD, 1981, STANFORD UNIVERSITY; volcanology
KAWASE, MITSUHIRO; PhD, 1986, PRINCETON UNIVERSITY; geophysical fluid dynamics; oceanic general circulation; tracer oceanography
KEIL, RICHARD G; PhD, 1991, UNIVERSITY OF DELAWARE; microbial degradation of organic compounds in aquatic and soil environments
KELLEY, DEBORAH S.; PhD, 1990, DALHOUSIE UNIVERSITY (CANADA); marine geology, volcanic-hosted submarine hydrothermal systems, sulfide-microbial habitats
LEE, CRAIG M; PhD, 1995, UNIVERSITY OF WASHINGTON; upper-ocean processes, internal waves, fronts, interactions between dynamics and biology
LESSARD, EVELYN J.; PhD, 1984, UNIVERSITY OF RHODE ISLAND; microzooplankton ecology and physiology; physical/biological interactions at oceanic fronts
MAC CREADY, PARKER; PhD, 1991, UNIVERSITY OF WASHINGTON; ocean circulation in estuaries and the southern ocean
NAPP, JEFFREY M; PhD, 1986, UNIVERSITY OF CALIFORNIA (SAN DIEGO); biological-physical interactions in the epipelagic zone, zooplankton ecology, fisheries oceanography
NYSTUEN, JEFFREY A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (SAN DIEGO); acoustical oceanography, applied to oceanic rainfall and physics of the air-sea interface
OLTMAN-SHAY, JOAN M; PhD, 1986, SCRIPPS OCEANOGRAPHIC INSTITUTION; nearshore waves and currents: wave climatology, generation and dissipation, sediment dynamics
RISER, STEPHEN C; PhD, 1981, UNIVERSITY OF RHODE ISLAND; physical oceanography, mesoscale mixing, physics of mesoscale eddies, numerical modeling

ROTHROCK, DAVID A; PhD, 1969, CAMBRIDGE UNIVERSITY (UK); physical oceanography, polar oceanography, polar ice remote sensing and modeling
SHUMAN, FRANK R; PhD, 1978, UNIVERSITY OF WASHINGTON; monitoring activities in marine waters: sediment, water, plants and animals, toxic substances
THOMPSON, LUANNE; PhD, 1990, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; numerical modeling of mesoscale and general circulation of the oceans
WARNER, MARK J; PhD, 1988, UNIVERSITY OF CALIFORNIA (SAN DIEGO); physical oceanography, ocean ventilation and mixing processes

Research Associate Professor

HOWE, BRUCE M.; PhD, 1986, UNIVERSITY OF CALIFORNIA (SAN DIEGO); physical oceanography, acoustic tomography

Assistant Professor

DUSHAW, BRIAN D.; PhD, 1992, UNIVERSITY OF CALIFORNIA (SAN DIEGO); acoustic tomography, applications to ocean temperature, tidal dissipation, ocean mixing
NEWTON, JAN A.; PhD, 1989, UNIVERSITY OF WASHINGTON; production and export of organic material, estuarine/coastal dynamics and marine water quality
SABINE, CHRISTOPHER L.; PhD, 1992, UNIVERSITY OF HAWAII; carbon cycling in the global oceans including air-sea fluxes and estimates of anthropogenic carbon
TYNAN, CYNTHIA T; PhD, 1993, UNIVERSITY OF CALIFORNIA (SAN DIEGO); biological-physical processes, distribution and abundances of plankton and marine mammals

School of Pharmacy

Medicinal Chemistry

Professor

ATKINS, WILLIAM M.; PhD, 1988, UNIVERSITY OF ILLINOIS; protein engineering
BAILLIE, THOMAS A.; PhD, 1973, UNIVERSITY OF GLASGOW (UK); medicinal chemistry.
DAGGETT, VALERIE D.; PhD, 1990, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); molecular modelling studies of peptides and proteins
ELMER, GARY W.; PhD, 1970, RUTGERS UNIVERSITY; pharmacognosy
HUITRIC, ALAIN C.; PhD, 1954, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); medicinal chemistry.
KRUPSKI, EDWARD; PhD, 1949, UNIVERSITY OF WASHINGTON; medicinal chemistry.
MC CARTHY, WALTER; PhD, 1949, INDIANA UNIVERSITY; medicinal chemistry.
NELSON, SIDNEY D.; PhD, 1974, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); medicinal chemistry, chemical toxicology
NELSON, WENDEL; PhD, 1965, UNIVERSITY OF KANSAS; medicinal chemistry.
RETTIE, ALLAN E.; PhD, 1983, UNIVERSITY OF NEWCASTLE-ON-TYNE (UK); drug metabolism: biochemical, analytical, mechanistic, and genetic aspects
TRAGER, WILLIAM F.; PhD, 1965, UNIVERSITY OF WASHINGTON; medicinal chemistry, bioanalytical chemistry drug metabolism

Associate Professor

KUNZE, KENT; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); medicinal chemistry and drug metabolism

Pharmaceutics

Professor

ANDERSON, GAIL; PhD, 1987, UNIVERSITY OF WASHINGTON; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma
HO, RODNEY J.Y.; PhD, 1987, UNIVERSITY OF TENNESSEE; maternal-fetal transmission of HIV
HU, SHIU-LOK; PhD, 1978, UNIVERSITY OF WISCONSIN; virus-host interactions, AIDS vaccines and pathogenesis of primate lentivirus infection
LEVY, RENE H.; PhD, 1970, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); metabolic interactions among antiepileptic drugs and between cytokines and drugs

SHEN, DANNY D.; PhD, 1975, STATE UNIVERSITY OF NEW YORK (BUFFALO); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anticonvulsants
THUMMEL, KENNETH E.; PhD, 1987, UNIVERSITY OF WASHINGTON; the metabolism of drugs by human liver and intestine
UNADKAT, JASHVANT D.; PhD, 1982, UNIVERSITY OF MANCHESTER (UK); mechanisms of transport of anti-HIV drugs across placenta, CSF-blood barrier, and intestine

Associate Professor

KUNZE, KENT; PhD, 1981, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); medicinal chemistry and drug metabolism
VICINI, PAOLO; PhD, 1996, POLYTECHNIC OF MILAN (ITALY); biomathematics and modeling methodology, mathematical models of biological systems

Pharmacy

Professor

ANDERSON, GAIL; PhD, 1987, UNIVERSITY OF WASHINGTON; pharmacokinetics, metabolism and interactions of drugs in epilepsy and trauma
BAUER, LARRY; PharmD, 1980, UNIVERSITY OF KENTUCKY; clinical pharmacokinetics and drug metabolism, drug interactions
BURKHART, VINCENT D.; MS, 1972, UNIVERSITY OF MARYLAND; institutional pharmacy practice and fiscal and personnel management
EDWARDS, WILLIAM A.; MS, 1971, UNIVERSITY OF WISCONSIN; gastrointestinal diseases, nutrition
ELLSWORTH, ALLAN J.; PharmD, 1977, PHILADELPHIA COLL OF PHARMACY & SCIENCE; primary care, family medicine
FASSETT, WILLIAM E.; PhD, 1992, UNIVERSITY OF WASHINGTON; pharmacy administration, professional ethics
GARDNER, JACQUELINE S.; PhD, 1980, UNIVERSITY OF WASHINGTON; pharmacoepidemiology, drug therapy use and effects, pharmacist practice patterns
GRAY, SHELLY L.; PharmD, 1989, UNIVERSITY OF MICHIGAN; geriatric pharmacy
HALL, NATHAN A.; PhD, 1948, UNIVERSITY OF WASHINGTON; pharmacy practice

HANSTEN, PHILIP D.; PharmD, 1968, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); drug interactions.
HEBERT, MARY F.; PharmD, 1987, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); transplantation, immunology pharmacotherapeutics
HORN, JOHN; PharmD, 1977, UNIVERSITY OF CINCINNATI; pharmacotherapeutics, with emphasis on drug interactions
KEDZIERSKI, MICHAEL; BS, 1970, UNIVERSITY OF WISCONSIN; substance abuse, community health care
ORR, JACK E.; PhD, 1943, UNIVERSITY OF WISCONSIN; pharmacy history
PATRICK, DONALD L.; PhD, 1972, COLUMBIA UNIVERSITY; health status and quality of life, end of life, adolescents
RAMSEY, SCOTT D.; PhD, 1994, UNIVERSITY OF PENNSYLVANIA; economics in medicine
SHEN, DANNY D.; PhD, 1975, STATE UNIVERSITY OF NEW YORK (BUFFALO); CNS pharmacokinetics and pharmacodynamics of opioid analgesics and anticonvulsants
STERGACHIS, ANDREAS S.; PhD, 1979, UNIVERSITY OF MINNESOTA; pharmacoepidemiology, pharmacy administration
SULLIVAN, SEAN; PhD, 1992, UNIVERSITY OF CALIFORNIA (BERKELEY); health economics, pharmaceutical outcomes research and health policy
WILLIAMS, DONALD H.; PharmB, 1958, MASSACHUSETTS COLLEGE OF PHARMACY; pharmacy law

Associate Professor

BLACK, DOUGLAS J.; PharmD, 1983, UNIVERSITY OF WASHINGTON; infectious diseases
BOMGAARS, DONALD L.; MBA, 1985, UNIVERSITY OF UTAH; hospital pharmacy.
HAZLET, THOMAS K.; DPH, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); pharmaceuticals policy, outcomes and bioethics
MCCUNE, JEANNINE S.; PharmD, 1995, UNIVERSITY OF NORTH CAROLINA; drug metabolism
ODEGARD, PEGGY SOULE; PharmD, 1990, UNIVERSITY OF WASHINGTON; clinical practice, pediatrics.
SCOTT, DALE H.; MS, 1978, OHIO STATE UNIVERSITY; hospital pharmacy.
VEENSTRA, DAVID; PhD, 1996, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); economic modeling and cost-effectiveness analysis in health care
WEBER, STANLEY S.; PharmD, 1975, UNIVERSITY OF CINCINNATI; psychiatric pharmacy practice, pharmacy distance learning

Research Associate Professor

BLOUGH, DAVID K.; PhD, 1982, IOWA STATE UNIVERSITY; Biostatistics applications; generalized linear models; time series analysis.

Assistant Professor

AU, DAVID H.; MD, 1993, UNIVERSITY OF CHICAGO; Chronic Lung Disease, Pharmacoepidemiology, Health services research, Communication

JOHNSON, ERIC S.; PhD, 1999, UNIVERSITY OF WASHINGTON; evaluate drug safety; describe burden of disease/clinical outcomes

POLIFKA, JANINE E.; PhD, 1985, UNIVERSITY OF LOUISVILLE; teratology

RITCHIE, CRAIG A.; JD, 1972, UNIVERSITY OF IDAHO; pharmacy law

WITEK, DONALD J.; BS, 1987, UNIVERSITY OF WASHINGTON; pharmacy

Lecturer

DAWSON, KARAN N.; MS, 1978, UNIVERSITY OF WASHINGTON; psychotropics, geriatrics, teaching methods

LAM, ANNIE Y.; PharmD, 1997, UNIVERSITY OF WASHINGTON; drug disposition and age, long-term-care pharmacy

MURPHY, NANCE L.; PharmB, 1977, WASHINGTON STATE UNIVERSITY; pharmacy education, geriatric practice and community pharmacy practice

ODEGAARD, MARY ANN; PhD, 1980, STANFORD UNIVERSITY; retailing and retail management

O'SULLIVAN, TERESA; PharmD, 1990, UNIVERSITY OF MINNESOTA; cystic fibrosis, general medicine, practice-related education, medical literature evaluation

Evans School of Public Affairs

Professor

ARCHIBALD, SANDRA O; PhD, 1984, UNIVERSITY OF CALIFORNIA (DAVIS); economics of public policy focusing on water resources, environmental policy & sustainable development

CRUTCHFIELD, JAMES A; PhD, 1954, UNIVERSITY OF CALIFORNIA (BERKELEY); natural resources economics, policy and management, especially marine and environmental resources

DENNY, BREWSTER C; PhD, 1959, FLETCHER SCHOOL OF LAW AND DIPLOMACY; American foreign and defense policy, science and public policy

DOBEL, J PATRICK; PhD, 1976, PRINCETON UNIVERSITY; political theory, ethics and public policy, organizational theory.

FAUSTMAN, ELAINE M.; PhD, 1980, MICHIGAN STATE UNIVERSITY; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds

GLOYD, STEPHEN S.; MD, 1973, UNIVERSITY OF CHICAGO; MPH, 1983, HARVARD UNIVERSITY; political economy, epidemiology, and primary health care in developing countries

GORDON, MARGARET T; PhD, 1972, NORTHWESTERN UNIVERSITY; news media and public policy; violence against women

HYMAN, BARRY; PhD, 1965, VIRGINIA POLYTECHNIC INST & STATE UNIV; engineering design, energy systems and policy, technology and public policy

LOCKE, HUBERT G.; MA, 1962, UNIVERSITY OF MICHIGAN; criminal justice, urban policy, race and ethnic relations

PLOTNICK, ROBERT D.; PhD, 1976, UNIVERSITY OF CALIFORNIA

(BERKELEY); economics of poverty, labor and social welfare policy

SMITH, STEVEN RATHGEB; PhD, 1988, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; the changing relationship between government and nonprofit organizations

WADDELL, PAUL A; PhD, 1989, UNIVERSITY OF TEXAS (DALLAS); urban policy, regional planning, growth management, land use, transportation, GIS

WATTS, CAROLYN A.; PhD, 1976, JOHNS HOPKINS UNIVERSITY; health economics and policy

WILLIAMS, WALTER; PhD, 1960, INDIANA UNIVERSITY; high-level decision making, policy implementation

ZERBE, RICHARD O.; PhD, 1969, DUKE UNIVERSITY; law and economics, cost-benefit analysis, economic history, environmental regulation

ZUMETA, WILLIAM M.; PhD, 1978, UNIVERSITY OF CALIFORNIA (BERKELEY); public policy analysis, higher education policy and finance, workforce policy

Research Professor

HILL, PAUL T.; PhD, 1972, OHIO STATE UNIVERSITY; political science, public policy, effects of regulation, especially on schools

Associate Professor

ANDERSON, C. LEIGH; PhD, 1989, UNIVERSITY OF WASHINGTON; institutional economics, international trade and environmental policy, international development

BROCK, JONATHAN; MBA, 1973, HARVARD UNIVERSITY; public

management, negotiation and mediation, labor relations, managing people

CULLEN, ALISON; DSc, 1992, HARVARD UNIVERSITY; environmental science, policy, quantitative decision making and management

MILLER, ERNEST G.; PhD, 1959, PRINCETON UNIVERSITY; management and organizational development, organization theory, administrative behavior.

Assistant Professor

FLETSCHNER, DIANA; PhD, 2002, UNIVERSITY OF WISCONSIN; Development Economics, Intrahousehold Decision-Making, Group Effects, Microfinance

KLEIT, RACHEL G.; PhD, 1999, UNIVERSITY OF NORTH CAROLINA; urban politics, public housing, urban planning

PAGE, STEPHEN B.; PhD, 1999, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; public management, interagency collaboration, U.S. social policy

Research Associate Professor

ROZA, MARGUERITE Y.M.; PhD, 1995, UNIVERSITY OF WASHINGTON; Education Policy and School Finance

Lecturer

CARLSON, DANIEL L.; MCP, 1972, UNIVERSITY OF CALIFORNIA (BERKELEY); urban policy, clinics

CORMICK, GERALD W; PhD, 1971, UNIVERSITY OF MICHIGAN; mediation and negotiation

MCINTIRE, JAMES L.; PhD, 1993, UNIVERSITY OF WASHINGTON; housing policy, state tax policy, labor market policy.

School of Public Health and Community Medicine

Biostatistics

Professor

ANDERSON, GARNET L.; PhD, 1989, UNIVERSITY OF WASHINGTON; clinical trial methodology, survival analysis, women's health, ovarian cancer screening

BENEDETTI, JACQUELINE K.; PhD, 1974, UNIVERSITY OF WASHINGTON; statistical methodology in infectious disease research, cancer clinical trials

BRESLOW, NORMAN; PhD, 1967, STANFORD UNIVERSITY; clinical trials, epidemiology, survival and categorical data.

DE ROUEN, TIMOTHY; PhD, 1971, VIRGINIA POLYTECHNIC INST & STATE UNIV; applications of biostatistics to clinical epidemiology of oral and infectious diseases

DIEHR, PAULA K.; PhD, 1970, UNIVERSITY OF CALIFORNIA (LOS ANGELES); health services, small-area analysis, health status

EMERSON, SCOTT S.; PhD, 1988, UNIVERSITY OF WASHINGTON; clinical trials, sequential testing, survival analysis, categorical data

ETZIONI, RUTH B.; PhD, 1990, CARNEGIE MELLON UNIVERSITY; statistical methods in cancer screening, Bayesian methods in biostatistics

FENG, ZIDING; PhD, 1990, CORNELL UNIVERSITY; correlated data methods, mixture models, cancer prevention

FISHER, LLOYD D.; PhD, 1966, DARTMOUTH COLLEGE; cardiovascular data analysis, clinical trials, multivariate statistics, longitudinal data analysis

FLEMING, THOMAS RICHARD; PhD, 1976, UNIVERSITY OF MARYLAND; survival analysis, cancer clinical trials, AIDS research, sequential analysis

GOOLEY, THEODORE A.; PhD, 1990, UNIVERSITY OF ARIZONA; design and analysis of clinical trials in bone marrow transplantation

HALLSTROM, ALFRED; PhD, 1968, BROWN UNIVERSITY; clinical trial methodologies in cardiovascular research and emergency medical services applications

HEAGERTY, PATRICK J.; PhD, 1995, JOHNS HOPKINS UNIVERSITY; longitudinal and dependent data analysis

HUGHES, JAMES P.; PhD, 1993, UNIVERSITY OF WASHINGTON; statistical methods in STD/AIDS research, longitudinal methods, Markov models

KENNEDY, KATHRYN D.; PhD, 1974, UNIVERSITY OF WASHINGTON; density estimation, cardiovascular data analysis, clinical trials

KOOPERBERG, CHARLES L.; PhD, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); splines, density estima-

tion, image reconstruction, spatial statistics, function estimation

KOPECKY, KENNETH J.; PhD, 1977, OREGON STATE UNIVERSITY; clinical trials design and survival data analysis, epidemiologic methodology, goodness of fit

KRONMAL, RICHARD A.; PhD, 1964, UNIVERSITY OF CALIFORNIA (LOS ANGELES); nonparametric density estimation, computer algorithms, cardiovascular data analysis

LIN, DANYU; PhD, 1989, UNIVERSITY OF MICHIGAN; analysis of failure time data, designs and analysis of clinical and epidemiologic studies

MOOLGAVKAR, SURESH H.; PhD, 1973, JOHNS HOPKINS UNIVERSITY; cancer epidemiology, development of quantitative methodology

PEPE, MARGARET; PhD, 1986, UNIVERSITY OF WASHINGTON; survival analysis, medical decision making, correlated data methods, child health issues

PETERSON, ARTHUR V.; PhD, 1975, STANFORD UNIVERSITY; survival data methodology, competing risks, design of disease prevention trials

PRENTICE, ROSS L.; PhD, 1970, UNIVERSITY OF TORONTO (CANADA); failure time analysis, disease prevention trials, epidemiologic methods, dietary factors and disease

SELF, STEVEN G.; PhD, 1981, UNIVERSITY OF WASHINGTON; longitudinal data analysis, survival time models, cancer prevention, HIV vaccine evaluation

STORER, BARRY E.; PhD, 1984, UNIVERSITY OF WASHINGTON; statistical methods in clinical trials and epidemiology

TEMKIN, NANCY R.; PhD, 1976, STATE UNIVERSITY OF NEW YORK (BUFFALO); clinical trials, recovery models, statistical modeling of epileptic phenomena, survival analysis.

THOMPSON, ELIZABETH A.; PhD, 1974, CAMBRIDGE UNIVERSITY (UK); statistical analysis of human genetic data, conservation and computational biology

VAN BELLE, GERALD; PhD, 1967, UNIVERSITY OF TORONTO (CANADA); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication

WAHL, PATRICIA W.; PhD, 1971, UNIVERSITY OF WASHINGTON; multivariate statistical techniques, especially regression analysis applied to cardiovascular data

WAKEFIELD, JONATHAN C.; PhD, 1992, UNIVERSITY OF NOTTINGHAM (UK); Bayesian data analysis, statistics in epidemiology, spatial epidemiology/pharmacodynamic models

WANG, CHING-YUN; PhD, 1993, TEXAS A&M UNIVERSITY; case-control study, missing data, measurement error, kernel smoothing

WELLNER, JON A.; PhD, 1975, UNIVERSITY OF WASHINGTON; large-sample theory, asymptotic efficiency, empirical processes, semiparametric models

ZHOU, XIAO-HUA ANDREW; PhD, 1991, OHIO STATE UNIVERSITY; Biostatistics, health services research, mental health research

Research Professor

BARLOW, WILLIAM E.; PhD, 1986, UNIVERSITY OF WASHINGTON; survival analysis, residuals, and evaluation of screening programs

LE BLANC, MICHAEL; PhD, 1989, UNIVERSITY OF WASHINGTON; Tree-based models, survival analysis, clinical trials, adaptive statistical methods

SHEPPARD, ELIZABETH A.; PhD, 1992, UNIVERSITY OF WASHINGTON; aggregate data, survival analysis, biostatistical methods in environmental health

THOMPSON, MARY LOU; PhD, 1979, GEORG-AUGUST UNIVERSITÄT (GERMANY); filtered point processes, diagonal methods, longitudinal reference ranges, maternal/child health

WIJSMAN, ELLEN M.; PhD, 1981, UNIVERSITY OF WISCONSIN; human quantitative and population genetics

Associate Professor

HUANG, YIJIAN; PhD, 1997, UNIVERSITY OF MINNESOTA; survival analysis, HIV/AIDS clinical trials and epidemiological studies

LEROUX, BRIAN; PhD, 1989, UNIVERSITY OF BRITISH COLUMBIA (CANADA); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology

LUMLEY, THOMAS S.; PhD, 1998, UNIVERSITY OF WASHINGTON; statistical methods applied to public health, medicine and environmental science.

POLISSAR, NAYAK LINCOLN; PhD, 1974, PRINCETON UNIVERSITY; statistical consulting, community surveys, clinical trials, demography, epidemiology, environment

RUTTER, CAROLYN; PhD, 1991, UNIVERSITY OF CALIFORNIA (LOS ANGELES); evaluation of diagnostic tests, ROC curve analysis and correlated data problems

STOREY, JOHN D.; PhD, 2002, STANFORD UNIVERSITY; statistical genomics, computational biology, applied statistics

THORNQUIST, MARK DANIEL; PhD, 1985, UNIVERSITY OF WISCONSIN;

ordinal/categorical response, repeated measures data, chemoprevention, group-randomized trials

XU, LI; PhD, 1994, UNIVERSITY OF WASHINGTON; genetic epidemiology and biostatistics

YANEZ III, NORBERT DAVID; PhD, 1993, ARIZONA STATE UNIVERSITY; generalized linear models, overdispersion, measurement error models

Research Associate Professor

MANCL, LLOYD A.; PhD, 1992, UNIVERSITY OF WASHINGTON; statistical methodology in periodontal disease, TMD, and correlated data

RICHARDSON, BARBRA ANN; PhD, 1993, UNIVERSITY OF CALIFORNIA (LOS ANGELES); statistical methods for data from AIDS/STD clinical trials

ROSSINI, ANTHONY J; DSc, 1994, HARVARD UNIVERSITY; statistical computing, bioinformatics, clinical trials, statistical analysis of laboratory data

Assistant Professor

HOFF, PETER D; PhD, 2000, UNIVERSITY OF WISCONSIN; constrained estimation, nonparametric Bayesian methods, two-sided matching models, cancer research

INOUE, LURDES; PhD, 1999, DUKE UNIVERSITY; Bayesian mthds in Biostat; Statistical Computing; Clinical Trials; Decision Theory & Cancer Rsrch

MONKS, STEPHANIE; PhD, 1999, NORTH CAROLINA STATE UNIVERSITY; statistical genetics, permutation tests, sampling design of genetic studies

Research Assistant Professor

BRUMBACK, LYNDIA C.; PhD, 2001, UNIVERSITY OF WISCONSIN; Functional data analysis; statistical applications in cystic fibrosis, cardiovascular, AIDS research

Environmental and Occupational Health

Professor

ALTMAN, LEONARD; MD, 1969, HARVARD UNIVERSITY; mechanisms of tissue injury produced by bacteria, leukocytes, or toxins

BARNHART, SCOTT; MD, 1979, GEORGE WASHINGTON UNIVERSITY; occupationally related lung disease

CHECKOWAY, HARVEY; PhD, 1978, UNIVERSITY OF NORTH CAROLINA; occupational and environmental epidemiology

COSTA, LUCIO GUIDO; PharmD, 1977, UNIVERSITY OF MILAN (ITALY); neurotoxicology; developmental and

molecular mechanisms/biological markers of neurotoxicity

DE WALLE, FOPPE B.; PhD, 2000, UNIVERSITY OF WASHINGTON; environmental health technology, hazardous waste, drinking water treatment, toxics reduction

EATON, DAVID L; PhD, 1978, UNIVERSITY OF KANSAS; biochemical and environmental toxicology, aflatoxin carcinogenesis, metabolism of toxic chemicals

FAUSTMAN, ELAINE M.; PhD, 1980, MICHIGAN STATE UNIVERSITY; developmental toxicology, risk assessment methodologies, toxicology of N-nitroso compounds

FENSKE, RICHARD A.; PhD, 1984, UNIVERSITY OF CALIFORNIA (BERKELEY); human exposure and health risk assessment, pesticide exposure

KALMAN, DAVID A; PhD, 1978, UNIVERSITY OF WASHINGTON; environmental chemistry, detection and fate of chemical hazards in natural and manmade environments

KAUFMAN, JOEL D.; MD, 1986, UNIVERSITY OF MICHIGAN; MPH, 1990, UNIVERSITY OF WASHINGTON; occupational and environmental epidemiology: etiologic research and public health surveillance

KAVANAGH, TERRANCE J; PhD, 1985, MICHIGAN STATE UNIVERSITY; free radical toxicology, glutathione metabolism, toxicology and aging

KEMP, CHRISTOPHER JAMES; PhD, 1989, UNIVERSITY OF WISCONSIN; genetic and environmental influence on multistage cancer in the mouse

KISSEL, JOHN C.; PhD, 1985, STANFORD UNIVERSITY; solid and hazardous waste management practice, human exposure assessment

KOENIG, JANE Q; PhD, 1963, UNIVERSITY OF WASHINGTON; respiratory physiology, health effects of air pollutants, lung response of susceptible groups

LARSON, TIMOTHY; PhD, 1976, UNIVERSITY OF WASHINGTON; airborne particles, air quality modeling, and instrument development

LUCHTEL, DANIEL L; PhD, 1969, UNIVERSITY OF WASHINGTON; electron microscopy and cell biology, lung anatomy/pathophysiology, fiber toxicology

MORGAN, MICHAEL S; DSc, 1972, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; applied respiratory, physiology and inhalation toxicology.

MOTTET, N KARLE; MD, 1952, YALE UNIVERSITY; effects of trace elements, especially methylmercury and arsenic, on growth and development.

OMENN, GILBERT S; PhD, 1972, UNIVERSITY OF WASHINGTON; genetic predisposition to environmental and occupational hazards

OMIECINSKI, CURTIS J; PhD, 1980, UNIVERSITY OF WASHINGTON; molecular toxicology, genetic regulation/expression of drug/chemical metabolizing enzymes

ROBKIN, MAURICE A; PhD, 1961, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; radiation dosimetry, environmental radioactivity, radioactive waste management, health physics

SEIXAS, NOAH S.; PhD, 1990, UNIVERSITY OF MICHIGAN; exposure assessment methods for occupational/epidemiologic studies; small industrial plants

VAN BELLE, GERALD; PhD, 1967, UNIVERSITY OF TORONTO (CANADA); biostatistics, environmental risk factors for neurodegenerative diseases, risk communication

WILSON, JOHN T; MD, 1950, COLUMBIA UNIVERSITY; DSc, 1956, UNIVERSITY OF CINCINNATI; environmental and occupational medicine, industrial toxicology

YOST, MICHAEL G.; PhD, 1989, UNIVERSITY OF CALIFORNIA (BERKELEY); worker exposures to physical agents, electromagnetic fields, noise and vibration

Research Professor

FANTEL, ALAN G; PhD, 1974, UNIVERSITY OF WASHINGTON; embryology, teratology

FRANKLIN, GARY M.; MD, 1969, GEORGE WASHINGTON UNIVERSITY; MPH, 1982, UNIVERSITY OF CALIFORNIA (BERKELEY); occupational injury, neurological epidemiology, public health nutrition

SHEPPARD, ELIZABETH A.; PhD, 1992, UNIVERSITY OF WASHINGTON; aggregate data, survival analysis, biostatistical methods in environmental health

WOODS, JAMES S; PhD, 1970, UNIVERSITY OF WASHINGTON; biochemical toxicology of trace metals; biological markers of metal exposure

Associate Professor

BREYSSE, PETER; MS, 1954, WASHINGTON STATE UNIVERSITY; MPH, 1957, UNIVERSITY OF PITTSBURGH; exposure of population to contaminants.

BURBACHER, THOMAS M; PhD, 1983, UNIVERSITY OF WASHINGTON; neurotoxicology, specializing in the behavioral effects of agents on the central nervous system

DANIELL, WILLIAM E; MD, 1979, TUFTS UNIVERSITY; MPH, 1986, UNIVERSITY OF WASHINGTON; noise-induced hearing loss; long-term disability associated with carpal tunnel syndrome

DOOLITTLE, THEUS LEE; PhD, 1963, UNIVERSITY OF SOUTHERN CALIFORNIA; physiology of exercise, physiological mechanical efficiency

GILBERT, STEVEN G.; PhD, 1986, UNIVERSITY OF ROCHESTER; primate neurobehavioral toxicology and teratology, developmental effects of heavy metals

GROSSMANN, ANGELIKA; PhD, 1982, FREIE UNIVERSITÄT BERLIN (GERMANY); immunosenescence in humans and mice; immunotoxicology; transmembrane signaling in T-lymphocytes

HATLEN, JACK B.; MS, 1958, UNIVERSITY OF WASHINGTON; environmental health program planning and management, environmental health manpower training

KEIFER, MATTHEW C.; MD, 1982, UNIVERSITY OF ILLINOIS; the human health effects of pesticide exposure

KISSEL, JOHN C.; PhD, 1985, STANFORD UNIVERSITY; solid and hazardous waste management practice, human exposure assessment

LEROUX, BRIAN; PhD, 1989, UNIVERSITY OF BRITISH COLUMBIA (CANADA); mixed models, correlated data, statistical applications in dentistry, toxicology, and psychology

LIU, LEE-JANE S.; DSc, 1994, HARVARD UNIVERSITY; air pollution, exposure assessment, environmental epidemiology

LIU, LEE-JANE S.; MS, 1991, HARVARD UNIVERSITY; air pollution, exposure assessment, environmental epidemiology

MARTIN, THOMAS G.; MD, 1977, PENNSYLVANIA STATE UNIVERSITY; general internal medicine

XIA, ZHENGUI; PhD, 1991, UNIVERSITY OF WASHINGTON; neuronal apoptosis, neuronal gene regulation

Assistant Professor

DE ROOS, ANNECLAIRE JENICE; PhD, 2000, UNIVERSITY OF NORTH CAROLINA; Occupational & environmental & chronic disease epidemiology, biomarkers of early effect

FIRESTONE, JORDAN A.; PhD, 1993, UNIVERSITY OF COLORADO (BOULDER); neurotoxicology

SHIN, GWY-AM; PhD, 1998, UNIVERSITY OF NORTH CAROLINA; Water and wastewater microbiology

SIMPSON, CHRISTOPHER DAVID; PhD, 1997, UNIVERSITY OF BRITISH COLUMBIA (CANADA); Exposure assessment, biomarker development, environmental analytical chemistry, industrial hygiene

Lecturer

CAMP, JANICE E.; MN, 1984, UNIVERSITY OF WASHINGTON; MS, 1984, UNIVERSITY OF WASHINGTON; workplace exposure assessment, evaluation of exposure, controls, program evaluation

FREEMAN, STANLEY H.; MA, 1959, STATE UNIVERSITY OF NEW YORK

(BUFFALO); industrial safety, program organization and administration.

MONTEITH, LEE E.; MS, 1956, UNIVERSITY OF WASHINGTON; industrial hygiene, analytical and environmental chemistry

MORRIS, SHARON L.; BA, 1965, REED COLLEGE; occupational safety and health policy, continuing education.

TRESER, CHARLES D.; MPH, 1976, UNIVERSITY OF MICHIGAN; administrative law and process in environmental health; housing; vector control

Epidemiology

Professor

ASTLEY, SUSAN J.; PhD, 1990, UNIVERSITY OF WASHINGTON; chronic childhood diseases.

AUSTIN, MELISSA A.; PhD, 1985, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic epidemiology of chronic diseases and public health genetics

BECKER, THOMAS; PhD, 1986, UNIVERSITY OF NEW MEXICO; diagnosis and prevention of Native American cancer

BERESFORD, SHIRLEY A.; PhD, 1981, UNIVERSITY OF LONDON (UK); nutritional epidemiology, folic acid, fruit and vegetables

BERESFORD, SHIRLEY A.; PhD, 1981, UNIVERSITY OF LONDON:KING'S COLLEGE (UK); nutritional epidemiology, folic acid, fruit and vegetables

BOYKO, EDWARD J.; MD, 1979, UNIVERSITY OF PITTSBURGH; epidemiology of inflammatory bowel disease and non-insulin-dependent diabetes mellitus

BURKE, WYLIE; PhD, 1974, UNIVERSITY OF WASHINGTON; ethical and policy implications of genetic information

CELUM, CONNIE L.; MD, 1984, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); infectious diseases

CHECKOWAY, HARVEY; PhD, 1978, UNIVERSITY OF NORTH CAROLINA; occupational and environmental epidemiology

CONNELL, FREDERICK A.; MD, 1972, NEW YORK UNIVERSITY; child health, child health services research, Medicaid, community health assessment

CRITCHLOW, CATHY W.; PhD, 1993, UNIVERSITY OF WASHINGTON; epidemiology of sexually transmitted diseases; HIV prevention, diseases of oral cavity

CUMMINGS, PETER; MD, 1970, CASE WESTERN RESERVE UNIVERSITY; MPH, 1993, UNIVERSITY OF WASHINGTON; injury epidemiology, emergency medicine, epidemiologic methods

DALING, JANET R.; PhD, 1977, UNIVERSITY OF WASHINGTON; maternal and child health and cancer research.

DAVIS, ROBERT L.; MD, 1983, UNIVERSITY OF CALIFORNIA (SAN DIEGO); MPH, 1993, UNIVERSITY OF WASHINGTON; childhood immunization, including adverse events perinatal and pediatric epidemiology

DAVIS, SCOTT; PhD, 1980, UNIVERSITY OF WASHINGTON; radiation and cancer, circadian disruption and cancer, hematopoietic cancers, epidemiologic methods

DREWNOWSKI, ADAM; PhD, 1977, ROCKEFELLER UNIVERSITY; taste and psychology of food choice in disease prevention

ELMORE, JOANN G.; MD, 1987, STANFORD UNIVERSITY; MPH, 1992, YALE UNIVERSITY; clinical epidemiology, breast cancer screening, diagnostic accuracy

EMANUEL, IRVIN; MA, 1956, UNIVERSITY OF ARIZONA; MD, 1960, UNIVERSITY OF ROCHESTER; MS, 1966, UNIVERSITY OF WASHINGTON; epidemiology of maternal and child health problems, growth and development

FOY, HJORDIS; PhD, 1968, UNIVERSITY OF WASHINGTON; epidemiology and control of infectious disease

GALE, JAMES L.; MD, 1961, COLUMBIA UNIVERSITY; MS, 1969, UNIVERSITY OF WASHINGTON; epidemiology and control of infectious disease, international health

GLOYD, STEPHEN S.; MD, 1973, UNIVERSITY OF CHICAGO; MPH, 1983, HARVARD UNIVERSITY; political economy, epidemiology, and primary health care in developing countries

GRAYSTON, J THOMAS; MD, 1948, UNIVERSITY OF CHICAGO; MS, 1952, UNIVERSITY OF CHICAGO; infectious causes (Chlamydia pneumoniae) of atherosclerotic cardiovascular disease

HANDSFIELD, HUNTER; MD, 1968, COLUMBIA UNIVERSITY; infectious diseases

HECKBERT, SUSAN R.; PhD, 1990, UNIVERSITY OF WASHINGTON; clinical and cardiovascular epidemiology, pharmacoepidemiology, pharmacogenetics

HENDERSON, MAUREEN M; MBBS, 1949, UNIVERSITY OF DURHAM (UK); DPH, 1956, UNIVERSITY OF DURHAM (UK); epidemiology of chronic diseases, dietary prevention of disease

HOLMES, KING K.; PhD, 1967, UNIVERSITY OF HAWAII; clinical epidemiology and pathogenesis of infectious diseases

HOLT, VICTORIA L.; PhD, 1990, UNIVERSITY OF WASHINGTON; womens reproductive health, intimate partner violence

JARVIK, GAIL P.; PhD, 1986, UNIVERSITY OF MICHIGAN; quantitative genetics and genetic epidemiology, focusing on common diseases

KIMBALL, ANN M.; MD, 1976, UNIVERSITY OF WASHINGTON; MPH, 1981, UNIVERSITY OF WASHINGTON;

- emerging infections, public health response to epidemic disease
- KING, MARY-CLAIRE; PhD, 1973, UNIVERSITY OF CALIFORNIA (BERKELEY); genetic analysis of complex human phenotypes, human diversity and evolution
- KOEPSSELL, THOMAS D; MD, 1972, HARVARD UNIVERSITY; MPH, 1979, UNIVERSITY OF WASHINGTON; injuries, neuroepidemiology, veterans health, epidemiologic methods, program and policy evaluation
- KOUTSKY, LAURAA; PhD, 1987, UNIVERSITY OF WASHINGTON; sexually transmitted diseases, HIV, etiology and natural history of cervical neoplasia
- KRISTAL, ALAN R.; DPH, 1983, COLUMBIA UNIVERSITY; nutritional epidemiology, dietary behavior, nutrition intervention, and cancer control
- KUKULL, WALTER A; PhD, 1984, UNIVERSITY OF WASHINGTON; neurological disease etiology, aging and methodology; focus on Alzheimers disease
- LACROIX, ANDREA Z.; PhD, 1984, UNIVERSITY OF NORTH CAROLINA; older womens health, osteoporosis, cardiovascular disease, cancer prevention
- LEE, JOHN A. H.; DPH, 1952, LONDON SCH OF HYGIENE & TROP MED (UK); MD, 1955, UNIVERSITY OF EDINBURGH (UK); epidemiology of neoplastic disease
- LONGSTRETH JR, W. T.; MD, 1975, UNIVERSITY OF PENNSYLVANIA; MPH, 1982, UNIVERSITY OF WASHINGTON; neurology
- MARCUSE, EDGAR K; MD, 1967, STANFORD UNIVERSITY; MPH, 1973, UNIVERSITY OF WASHINGTON; general pediatrics
- MARTIN, DIANE P; PhD, 1979, UNIVERSITY OF WASHINGTON; research methods; health services quality, use, and outcomes
- MAYER, JONATHAN D; PhD, 1977, UNIVERSITY OF MICHIGAN; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases
- MOOLGAVKAR, SURESH H.; PhD, 1973, JOHNS HOPKINS UNIVERSITY; cancer epidemiology, development of quantitative methodology
- MUELLER, BETH A.; DPH, 1984, TULANE UNIVERSITY; epidemiology of perinatal and reproductive diseases, cancer, and injury research
- NOLAN, CHARLES M; MD, 1969, UNIVERSITY OF ARKANSAS; infectious diseases.
- OBERLE, MARK W.; MD, 1974, JOHNS HOPKINS UNIVERSITY; Public Health; Native American Health.
- PATRICK, DONALD L.; PhD, 1972, COLUMBIA UNIVERSITY; health status and quality of life, end of life, adolescents
- PENDERGRASS, THOMAS W; MD, 1971, UNIVERSITY OF TENNESSEE; MPH, 1979, UNIVERSITY OF WASHINGTON; hematology, oncology
- POTTER, JOHN D; PhD, 1984, UNIVERSITY OF QUEENSLAND (AUSTRALIA); colorectal cancer etiology, gene-environment interaction, early detection, molecular epidemiology
- PROBSTFIELD, JEFFREY L.; MD, 1967, UNIVERSITY OF WASHINGTON; cardiology
- PSATY, BRUCE M.; PhD, 1979, INDIANA UNIVERSITY; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology
- REIBER, GAYLE; PhD, 1989, UNIVERSITY OF WASHINGTON; epidemiology and health services research on preventing complications of diabetes
- RIVARA, FREDERICK P.; MD, 1974, UNIVERSITY OF PENNSYLVANIA; pediatric epidemiology and injury prevention and research
- SCHWARTZ, STEPHEN MARC; PhD, 1990, UNIVERSITY OF WASHINGTON; cancer, cardiovascular disease, reproductive conditions; molecular/genetic epidemiology; methods
- SHY, KIRKWOOD K; MD, 1973, WAYNE STATE UNIVERSITY; epidemiologic applications to problems in obstetrics and gynecology
- SISCOVICK, DAVID S.; MD, 1976, UNIVERSITY OF MARYLAND; epidemiology
- STAMM, WALTER E; MD, 1971, HARVARD UNIVERSITY; infectious disease
- STERGACHIS, ANDREAS S; PhD, 1979, UNIVERSITY OF MINNESOTA; pharmacoepidemiology, pharmacy administration
- STEVENS, NANCY G; MD, 1979, UNIVERSITY OF WASHINGTON; MPH, 1982, UNIVERSITY OF WASHINGTON; family medicine
- SUGARMAN, JONATHAN R.; MD, 1981, ALBERT EINSTEIN COLLEGE OF MEDICINE; MPH, 1990, UNIVERSITY OF WASHINGTON; American Indian and Alaska Native health; Health Care Quality Assessment and Improvement
- THOMAS, DAVID B; MD, 1963, UNIVERSITY OF WASHINGTON; DPH, 1972, JOHNS HOPKINS UNIVERSITY; cervix and breast carcinoma epidemiology.
- VAUGHAN, THOMAS L; MD, 1978, UNIVERSITY OF ILLINOIS; MPH, 1983, UNIVERSITY OF WASHINGTON; cancer, environmental epidemiology.
- VERNEZ-MOUDON, ANNE; DSc, 1987, ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE; urban design, city form and neighborhood studies, design research
- WEISS, NOEL S; MD, 1967, STANFORD UNIVERSITY; DPH, 1971, HARVARD UNIVERSITY; chronic disease epidemiology
- WHITE, J EMILY; PhD, 1982, UNIVERSITY OF WASHINGTON; cancer epidemiology and prevention
- WILLIAMS, MICHELLE A.; DSc, 1991, HARVARD UNIVERSITY; reproductive and perinatal epidemiology, cancer epidemiology

Research Professor

- JACKSON, LISA A.; MD, 1988, UNIVERSITY OF VIRGINIA; MPH, 1996, UNIVERSITY OF WASHINGTON; infectious disease epidemiology, assessments of vaccine safety and effectiveness
- MCTIERNAN, ANNE; PhD, 1982, UNIVERSITY OF WASHINGTON; breast and colon cancer, womens health, exercise and obesity
- PATTERSON, RUTH E.; PhD, 1992, UNIVERSITY OF NORTH CAROLINA; dietary assessment in adult populations, dietary change, vitamin supplements in cancer prevention
- STANFORD, JANET L.; PhD, 1985, JOHNS HOPKINS UNIVERSITY; cancer epidemiology and genetic susceptibility

Associate Professor

- CHU, JOSEPH; MD, 1975, GEORGETOWN UNIVERSITY; gynecologic cancer epidemiology, perinatal epidemiology, health services research
- DUCHIN, JEFFREY S.; MD, 1985, RUTGERS UNIVERSITY; infectious diseases and epidemiology
- EDWARDS, KAREN L.; PhD, 1996, UNIVERSITY OF WASHINGTON; genetic epidemiology, public health genetics, diabetes, cardiovascular disease
- FANN, JESSE R.; MD, 1989, NORTHWESTERN UNIVERSITY; MPH, 1995, UNIVERSITY OF WASHINGTON; neuropsychiatry, psycho-oncology, epidemiology, health services research, depression, delirium
- GOLDBAUM, GARY M.; MD, 1978, UNIVERSITY OF COLORADO (DENVER); MPH, 1989, UNIVERSITY OF WASHINGTON; preventive medicine, chronic diseases prevention, injury prevention
- HASELKORN, JODIE K.; MD, 1985, LOUISIANA STATE UNIVERSITY; health services for the disabled: diagnostic accuracy of tests, effectiveness of interventions
- HELGERSON, STEVEN D.; MD, 1973, UNIVERSITY OF WASHINGTON; MPH, 1976, UNIVERSITY OF WASHINGTON; Public health practice and epidemiologic field investigation
- HITTI, JANE; MD, 1989, UNIVERSITY OF VERMONT; MPH, 1995, UNIVERSITY OF WASHINGTON; perinatal medicine, HIV and pregnancy
- JOHN STEWART, GRACE C.; MD, 1987, UNIVERSITY OF MICHIGAN; MPH,

1995, UNIVERSITY OF WASHINGTON; mother-to-child HIV-1 transmission (specifically, Africa, cofactors, breastmilk)

KAUFMAN, JOEL D.; MD, 1986, UNIVERSITY OF MICHIGAN; MPH, 1990, UNIVERSITY OF WASHINGTON; occupational and environmental epidemiology: etiologic research and public health surveillance

KESTIN, MARK; PhD, 1989, FLINDERS UNIVERSITY (AUSTRALIA); relationship between nutrition, cancer and cardiovascular disease

MARTIN, MICHAEL D.; PhD, 1993, UNIVERSITY OF WASHINGTON; dental education in oral health care of persons with disability

MOCK, CHARLES N.; MD, 1980, BROWN UNIVERSITY; injury: epidemiology, prevention, treatment; especially in less-developed countries

OLSON, CARIN M.; MD, 1978, OHIO STATE UNIVERSITY; general internal medicine

REED, SUSAN D.; MS, 1979, SARAH LAWRENCE COLLEGE; MD, 1986, STANFORD UNIVERSITY; gynecology, evidence-based medicine and clinical outcomes studies, hormone replacement therapy

STEHMAN-BREEN, CATHERINE O; MD, 1990, UNIVERSITY OF CHICAGO; MS, 1996, UNIVERSITY OF WASHINGTON; cardiovascular epidemiology among patients with end-stage renal disease

STEHR-GREEN, PAUL; DPH, 1982, UNIVERSITY OF PITTSBURGH; chronic, infectious, vaccine-preventable diseases, environmental health, health-care delivery

TSU, VIVIEN D.; PhD, 1991, UNIVERSITY OF WASHINGTON; maternal and child health in developing countries

TSUANG, DEBBY W.; MD, 1988, UNIVERSITY OF IOWA; genetics of schizophrenia and late-life dementia

WALD, ANNA; MD, 1985, MT SINAI SCHOOL OF MEDICINE; MPH, 1994, UNIVERSITY OF WASHINGTON; the epidemiology, natural history and therapeutics of HSV and other herpesviruses infections

WEIGLER, BENJAMIN J.; PhD, 1991, UNIVERSITY OF CALIFORNIA (DAVIS); infectious disease epidemiology in laboratory animal medicine and management

Research Associate Professor

CANGELOSI, GERARD A.; PhD, 1984, UNIVERSITY OF CALIFORNIA (DAVIS); molecular biology of tuberculosis

HOOVER, J JOANNE; MD, 1960, UNIVERSITY OF ILLINOIS; MPH, 1972, UNIVERSITY OF WASHINGTON; cardiovascular epidemiology, public health practice

LAMPE, JOHANNA W; PhD, 1990, UNIVERSITY OF MINNESOTA; gene-diet interactions and cancer

susceptibility: phytochemicals, biotransformation enzymes, colon

MCGRATH, BARBARA B.; PhD, 1993, UNIVERSITY OF WASHINGTON; ethnographic studies with U.S. Pacific Islanders on health issues, specifically, HIV/AIDS prevention

REINER, ALEXANDER P.; MD, 1984, JOHNS HOPKINS UNIVERSITY; hematology

ROSSING, MARY ANNE; PhD, 1993, UNIVERSITY OF WASHINGTON; cancer epidemiology, particularly cancers of the reproductive system

Assistant Professor

DE ROOS, ANNECLAIRE JENICE; PhD, 2000, UNIVERSITY OF NORTH CAROLINA; Occupational & environmental & chronic disease epidemiology, biomarkers of early effect

DUNCAN, GLEN E; PhD, 1997, UNIVERSITY OF TENNESSEE; Prevention and treatment of type 2 diabetes, obesity, metabolism, exercise

FARQUHAR, CAREY; MD, 1994, HARVARD UNIVERSITY; MPH, 2001, UNIVERSITY OF WASHINGTON; HIV in Kenya: mother-to-child HIV transmission, correlates of immunity to HIV, couple counseling

GOLDEN, MATTHEW R; MPH, 1993, JOHNS HOPKINS UNIVERSITY; MD, 1994, JOHNS HOPKINS UNIVERSITY; allergy and infectious diseases

HAWES, STEPHEN E.; PhD, 2001, UNIVERSITY OF WASHINGTON; Epidemiology of HIV/AIDS, Human Papillomavirus (HPV), and other Sexually Transmitted Diseases

KURTH, ANN E.; PhD, 2003, UNIVERSITY OF WASHINGTON; sexually transmitted infection screening & prevention; clinical epidemiology; applied informatics

MANHART, LISA E.; PhD, 2002, UNIVERSITY OF WASHINGTON; Epidemiology of sexually transmitted diseases

MCCLELLAND, RAYMOND SCOTT; MD, 1995, UNIVERSITY OF WASHINGTON; MPH, 2001, UNIVERSITY OF WASHINGTON; International HIV-1 and sexually transmitted disease epidemiology and clinical research

SHERMAN, KAREN J; PhD, 1983, CORNELL UNIVERSITY; Epidemiologic methods for complementary and alternative medicine.

Research Assistant Professor

LI, CHRISTOPHER I-FU; MPH, 2000, UNIVERSITY OF WASHINGTON; MD, 2000, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); Cancer etiology and outcomes, breast cancer, hormonal exposures

STARR, JACQUELINE R; PhD, 2003, UNIVERSITY OF WASHINGTON; clinical and genetic epidemiology of craniofacial malformations, epidemiologic methods

Lecturer

BRUEMMER, BARBARA; PhD, 1993, UNIVERSITY OF WASHINGTON; Antioxidant supplementation; body weight and mortality following cancer therapy.

WILLIAMS, MARCIA FRANCES; PhD, 2000, UNIVERSITY OF WASHINGTON; physical therapy

Health Services

Professor

ALTAMORE, RITA A; MD, 1977, BOSTON UNIVERSITY; information systems in health services, quality of health care

BALDWIN, LAURA M.; MD, 1980, UNIVERSITY OF SOUTHERN CALIFORNIA; MPH, 1986, UNIVERSITY OF WASHINGTON; family medicine.

BERKOWITZ, BOBBIE; PhD, 1990, CASE WESTERN RESERVE UNIVERSITY; administration, leadership and policy development within public health and nursing

BLACKMORE, CHRISTOPHER C.; MD, 1990, UNIVERSITY OF ROCHESTER; MPH, 1997, UNIVERSITY OF WASHINGTON; body imaging, teleradiology, digital radiology, MRI/CT

BOWEN, DEBORAH J; PhD, 1986, UNIFORMED SERVICE U OF THE HEALTH SC.; health psychology

CHERKIN, DANIEL C; PhD, 1978, UNIVERSITY OF WASHINGTON; outcomes of care for back pain and other common problems

CHRISMAN, NOEL J; PhD, 1966, UNIVERSITY OF CALIFORNIA (BERKELEY); health beliefs and practices, social networks and social support; clinically applied anthropology

CONNELL, FREDERICK A; MD, 1972, NEW YORK UNIVERSITY; child health, child health services research, Medicaid, community health assessment

CONRAD, DOUGLAS A; PhD, 1978, UNIVERSITY OF CHICAGO; alternative vertical and horizontal market structures in health care

COOMBS, JOHN B.; MD, 1972, CORNELL UNIVERSITY; Health care outcomes, rural health policy, healthcare workforce issues and applied nutrition.

CRITTENDEN, ROBERT A; MD, 1976, UNIVERSITY OF WASHINGTON; MPH, 1987, UNIVERSITY OF WASHINGTON; health plans/policies

CURTIS, JARED R.; MD, 1988, JOHNS HOPKINS UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; pulmonary diseases and critical care medicine

DAY, ROBERT W; PhD, 1962, UNIVERSITY OF CALIFORNIA (BERKELEY); translational research

DEYO, RICHARD A.; MD, 1975, PENNSYLVANIA STATE UNIVERSITY; health

- status measurement and evaluation of common medical practices
- DIEHR, PAULA K.; PhD, 1970, UNIVERSITY OF CALIFORNIA (LOS ANGELES); health services, small-area analysis, health status
- DOWLING, WILLIAM L.; PhD, 1971, UNIVERSITY OF MICHIGAN; strategic management of health-care organizations, managed care
- ETZIONI, RUTH B.; PhD, 1990, CARNEGIE MELLON UNIVERSITY; statistical methods in cancer screening, Bayesian methods in biostatistics
- FIHN, STEPHAN; MD, 1977, ST LOUIS UNIVERSITY; MPH, 1981, UNIVERSITY OF WASHINGTON; internal medicine
- FULLER, SHERRILYNNE S00; PhD, 1984, UNIVERSITY OF SOUTHERN CALIFORNIA; Analysis, representation and mapping of research findings (data mining.)
- GILSON, BETTY S.; MD, 1943, UNIVERSITY OF MINNESOTA; health-status measurement
- GLOYD, STEPHEN S.; MD, 1973, UNIVERSITY OF CHICAGO; MPH, 1983, HARVARD UNIVERSITY; political economy, epidemiology, and primary health care in developing countries
- GOLDBERG, HAROLD I.; MD, 1977, STANFORD UNIVERSITY; applying clinical informatics to health services delivery and quality improvement
- GREMBOWSKI, DAVID; PhD, 1982, UNIVERSITY OF WASHINGTON; health services research, survey research, program evaluation, performance of health care systems
- GROSSMAN, DAVID C.; MPH, 1990, UNIVERSITY OF WASHINGTON; injury control, Native American health, and pediatric health services research
- GROSSMAN, DAVID C.; MD, 1982, UNIVERSITY OF CALIFORNIA (LOS ANGELES); injury control, Native American health, and pediatric health services research
- HALE, CHRISTIANE B.; PhD, 1978, UNIVERSITY OF CINCINNATI; quantitative analyses of small area health outcomes
- HART, LAWRENCE G; PhD, 1985, UNIVERSITY OF WASHINGTON; rural health policy, medical geography
- HEDRICK, SUSAN; PhD, 1982, MICHIGAN STATE UNIVERSITY; long-term care
- HEGYVARY, SUE T.; PhD, 1974, VANDERBILT UNIVERSITY; administration and productivity of health care and nursing services
- JARVIK, JEFFREY G; MD, 1987, UNIVERSITY OF CALIFORNIA (SAN DIEGO); neuroradiology, outcomes research
- KATON, WAYNE J; MD, 1976, UNIVERSITY OF OREGON; depression, panic disorder, somatization, adherence
- KOEPSSELL, THOMAS D; MD, 1972, HARVARD UNIVERSITY; MPH, 1979, UNIVERSITY OF WASHINGTON; injuries, neuroepidemiology, veterans health, epidemiologic methods, program and policy evaluation
- LARSON, ERIC B; MD, 1973, HARVARD UNIVERSITY; internal medicine
- LOGERFO SR., JAMES P; MD, 1968, UNIVERSITY OF ROCHESTER; MPH, 1974, UNIVERSITY OF WASHINGTON; quality-of-care assessment
- MARLATT, G ALAN; PhD, 1968, INDIANA UNIVERSITY; cognitive-behavior therapy and assessment, addictive behaviors, relapse prevention, harm reduction
- MARTIN, DIANE P; PhD, 1979, UNIVERSITY OF WASHINGTON; research methods; health services quality, use, and outcomes
- MAYER, JONATHAN D; PhD, 1977, UNIVERSITY OF MICHIGAN; medical geography, health policy, env. health, epidemiology, intl. health, infectious diseases
- MEISCHKE, HENDRIKA W.; PhD, 1992, UNIVERSITY OF MICHIGAN; health communication, with an emphasis on mass media and health
- MILGROM, PETER M; DDS, 1972, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); management of fearful and phobic dental patients, quality of dental care.
- MITCHELL, PAMELA H; PhD, 1991, UNIVERSITY OF WASHINGTON; neuroscience nursing, diagnostic strategies
- MOCK, CHARLES N.; MD, 1980, BROWN UNIVERSITY; injury: epidemiology, prevention, treatment; especially in less-developed countries
- MONSEN, ELAINE R; PhD, 1961, UNIVERSITY OF CALIFORNIA (BERKELEY); nutrition, dietetics
- MOURADIAN, WENDY ELYSE; MD, 1977, COLUMBIA UNIVERSITY; Ethics and quality of life in children's oral, craniofacial health.
- MUECKE, MARJORIE A; PhD, 1976, UNIVERSITY OF WASHINGTON; community health, medical anthropology, reproductive health, Southeast Asia (Thailand)
- NORRIS, THOMAS E.; MD, 1973, UNIVERSITY OF TEXAS (GALVESTON); Clinical applications, health policy and health workforce needs.
- OBERLE, MARK W.; MD, 1974, JOHNS HOPKINS UNIVERSITY; Public Health; Native American Health.
- PATRICK, DONALD L.; PhD, 1972, COLUMBIA UNIVERSITY; health status and quality of life, end of life, adolescents
- PEARLMAN, ROBERT A; MD, 1975, BOSTON UNIVERSITY; gerontology
- PERRIN, EDWARD; PhD, 1961, STANFORD UNIVERSITY; biostatistics, health information, health services research methodology
- PLOUGH, ALONZO L.; PhD, 1978, CORNELL UNIVERSITY; anthropology, sociology or social welfare and public affairs/policy, epidemiology
- PSATY, BRUCE M.; PhD, 1979, INDIANA UNIVERSITY; cardiovascular disease, coronary heart disease, hypertension, pharmacoepidemiology
- RAMSEY, SCOTT D.; PhD, 1994, UNIVERSITY OF PENNSYLVANIA; economics in medicine
- REIBER, GAYLE; PhD, 1989, UNIVERSITY OF WASHINGTON; epidemiology and health services research on preventing complications of diabetes
- ROSENBLATT, ROGER A; MPH, 1971, HARVARD UNIVERSITY; MD, 1971, HARVARD UNIVERSITY; research into the organization and delivery of health services, rural health policy
- ROSS, AUSTIN; MPH, 1955, UNIVERSITY OF CALIFORNIA (BERKELEY); ambulatory care, health care delivery systems
- SULLIVAN, SEAN; PhD, 1992, UNIVERSITY OF CALIFORNIA (BERKELEY); health economics, pharmaceutical outcomes research and health policy
- THOMPSON, ENGELBERTA; PhD, 1981, WESTERN MICHIGAN UNIVERSITY; community studies, cancer prevention, smoking cessation, childrens pesticide exposure
- THOMPSON, FRANCES ELAINE A; PhD, 1990, UNIVERSITY OF WASHINGTON; attribution theory, adolescent drug use, suicide
- UNUTZER, JURGEN; MA, 1988, UNIVERSITY OF CHICAGO; MD, 1990, VANDERBILT UNIVERSITY; MPH, 1996, UNIVERSITY OF WASHINGTON; Mental health services in primary care. Depression & comorbid medical illness. Late-life depression
- VITALIANO, PETER P; PhD, 1975, SYRACUSE UNIVERSITY; psychiatric methodology (epidemiology, design, psychometrics), behavioral medicine
- WAGNER, EDWARD H; MD, 1965, STATE UNIVERSITY OF NEW YORK (BUFFALO); MPH, 1972, UNIVERSITY OF NORTH CAROLINA; clinical epidemiology and health services research, health promotion and disease prevention
- WATTS, CAROLYN A.; PhD, 1976, JOHNS HOPKINS UNIVERSITY; health economics and policy
- WICKIZER, THOMAS M.; PhD, 1989, UNIVERSITY OF MICHIGAN; health economics, health policy, program evaluation, quality improvement, occupational health
- WILLIAMS, MICHELLE A.; DSc, 1991, HARVARD UNIVERSITY; reproductive and perinatal epidemiology, cancer epidemiology
- WOLF, FREDRIC M; PhD, 1980, KENT STATE UNIVERSITY; clinical decision making, evaluationof new technology, evidence-based health care

YUEH, BEVAN; MD, 1989, STANFORD UNIVERSITY; clinical epidemiology of hearing loss and head and neck cancer

Research Professor

BEATON, RANDAL D.; PhD, 1972, UNIVERSITY OF WASHINGTON; assessment and treatment of temporomandibular joint pain and dysfunction
CHAPKO, MICHAEL K.; PhD, 1972, CITY UNIVERSITY OF NEW YORK; ambulatory care, long-term care, cost-effectiveness in health care, international health
CHEADLE, ALLEN D.; PhD, 1987, UNIVERSITY OF CALIFORNIA (BERKELEY); community based research and program evaluation
MAYNARD, CHARLES C.; PhD, 1986, UNIVERSITY OF WASHINGTON; cardiovascular health services research
TAYLOR, VICTORIA M.; MD, 1978, UNIVERSITY OF NOTTINGHAM (UK); MPH, 1989, UNIVERSITY OF WASHINGTON; cancer control in minority populations
URBAN, NICOLE D.; MS, 1973, HARVARD UNIVERSITY; ; DSc, 1978, HARVARD UNIVERSITY; analysis of the cost-effectiveness of disease prevention trials and interventions

Associate Professor

BELL, MICHELLE; PhD, 1984, UNIVERSITY OF WASHINGTON; maternal/child health, adolescent health, access to health services for disadvantaged populations
BRADLEY, KATHARINE A.; MD, 1987, STANFORD UNIVERSITY; MPH, 1993, UNIVERSITY OF WASHINGTON; general internal medicine
CHRISTAKIS, DIMITRI A.; MD, 1993, UNIVERSITY OF PENNSYLVANIA; MPH, 1998, UNIVERSITY OF WASHINGTON; general pediatrics
DOCTOR, JASON N.; PhD, 1995, UNIVERSITY OF CALIFORNIA (SAN DIEGO); medical decision making, health economics, decision theory
DOESCHER, MARK; MD, 1989, UNIVERSITY OF CALIFORNIA (SAN FRANCISCO); family medicine, medically vulnerable populations, primary care research
ENSGN, B. JOSEPHINE; MS, 1986, VIRGINIA COLLEGE OF MEDICINE; MPH, 1992, JOHNS HOPKINS UNIVERSITY; DPH, 1994, JOHNS HOPKINS UNIVERSITY; health care program planning and evaluation for marginalized populations and high-risk youth
FLUM, DAVID R.; MD, 1991, UNIVERSITY OF MIAMI (FLORIDA); improving surgical care quality in the community at large, identifying & promoting "best" practices
GOLDBAUM, GARY M.; MD, 1978, UNIVERSITY OF COLORADO (DENVER); MPH, 1989, UNIVERSITY OF

WASHINGTON; preventive medicine, chronic diseases prevention, injury prevention
HAZLET, THOMAS K.; DPH, 1991, UNIVERSITY OF CALIFORNIA (BERKELEY); pharmaceuticals policy, outcomes and bioethics
HELGERSON, STEVEN D.; MD, 1973, UNIVERSITY OF WASHINGTON; MPH, 1976, UNIVERSITY OF WASHINGTON; Public health practice and epidemiologic field investigation
HUEBNER, COLLEEN ELLEN; PhD, 1991, UNIVERSITY OF WASHINGTON; the social bases of developmental problems in early childhood
JOHNSON, DONNA; PhD, 1995, UNIVERSITY OF WASHINGTON; public health nutrition practice: obesity, maternal and child nutrition
KIENAST, PHILIP K.; PhD, 1972, MICHIGAN STATE UNIVERSITY; human resources management
KINNE, SUSAN; PhD, 1986, UNIVERSITY OF WASHINGTON; disability statistics/prevention, measurement of community needs, worksite health promotion
KOPJAR, BRANKO; PhD, 1996, UNIVERSITY OF OSLO (NORWAY); statistics and epidemiological studies
LAFFERTY, WILLIAM E.; MD, 1978, UNIVERSITY OF KANSAS; STDs, HIV/AIDS, surveillance and epidemiology of STD, managed care
LESSLER, DANIEL; MD, 1986, STANFORD UNIVERSITY; MHA, 1992, UNIVERSITY OF WASHINGTON; health services research pertaining to cost-effectiveness, quality of care, medical management
LOZANO, PAULA; MD, 1989, HARVARD UNIVERSITY; MPH, 1994, UNIVERSITY OF WASHINGTON; general pediatrics, asthma, evidence-based medicine
LYDON-ROCHELLE, MONA; PhD, 1999, UNIVERSITY OF WASHINGTON; applied epidemiology in maternal health
MACIEJEWSKI, MATTHEW L.; PhD, 1998, UNIVERSITY OF MINNESOTA; managed care, outcomes research, research methods, health economics, diabetes
MELZER, SANFORD M.; MD, 1982, MT SINAI SCHOOL OF MEDICINE; general pediatrics
ROBINS, LYNNE S.; PhD, 1990, UNIVERSITY OF MICHIGAN; cultural competence, physician-patient communication, qualitative research assessment
RUTTER, CAROLYN; PhD, 1991, UNIVERSITY OF CALIFORNIA (LOS ANGELES); evaluation of diagnostic tests, ROC curve analysis and correlated data problems
SALES, ANNE; PhD, 1998, UNIVERSITY OF MINNESOTA; patient and organizational outcomes, health care work force, health economics
SHELL-DUNCAN, BETTINA; PhD, 1994, PENNSYLVANIA STATE UNIVERSITY; health assessment in traditional

societies, including immunity, nutrition, and anthropological demog
SPIGNER, CLARENCE; DPH, 1987, UNIVERSITY OF CALIFORNIA (BERKELEY); health of the disadvantaged; race/ethnic relations; societal behavior, popular culture
SPIGNER, CLARENCE; MPH, 1982, UNIVERSITY OF CALIFORNIA (BERKELEY); health of the disadvantaged; race/ethnic relations; societal behavior, popular culture
STOUT, JAMES W.; MAT, 1981, DUKE UNIVERSITY; MD, 1986, WAKE FOREST UNIVERSITY; childhood asthma, health services and epidemiology
ZIERLER, BRENDA; PhD, 1996, UNIVERSITY OF WASHINGTON; research in patient with venous thromboembolism; clinical outcomes, process outcomes

Research Associate Professor

JOHNSON, LEONARD CLARK; PhD, 1978, UNIVERSITY OF WASHINGTON; applied research methods including development in applied statistics, assessment, and analysis
LALONDE, BERNADETTE; PhD, 1979, UNIVERSITY OF TORONTO (CANADA); public health program development, process and outcome program evaluation, evaluation research
RIVIN, BETH E.; MD, 1982, EAST CAROLINA UNIVERSITY; MPH, 1985, HARVARD UNIVERSITY; Health and Human Rights
WEAVER, MARCIA R.; PhD, 1986, UNIVERSITY OF CHICAGO; HIV/AIDS, cost-effectiveness of community-based care, contingent valuation, health care reform

Assistant Professor

KARRAS, BRYANT THOMAS; MD, 1995, UNIVERSITY OF WISCONSIN; public health informatics, guidelines, bioterrorism surveillance
MASTROIANNI, ANNA C.; JD, 1986, UNIVERSITY OF PENNSYLVANIA; MPH, 1997, UNIVERSITY OF WASHINGTON; Law, ethics and policy genetics, reproduction, human subjects research.
PHELAN, ELIZABETH A.; MD, 1992, TUFTS UNIVERSITY; MS, 1998, UNIVERSITY OF WASHINGTON; prevention of functional decline in older adults, how systems can support preservation of function

Research Assistant Professor

LIU, CHUAN-FEN; PhD, 1994, UNIVERSITY OF MINNESOTA; health economics, health services research, mental health
RIEDY, CHRISTINE A.; PhD, 1997, UNIVERSITY OF WASHINGTON; children's oral health - cultural diversity,

dietary influences; symptom self-report in children

Lecturer

DOWNER, ANN E.; MS, 1984, UNIVERSITY OF WASHINGTON; EdD, 1996, SEATTLE UNIVERSITY; education and training, educational program design and development, health communication
GONZALES, VIRGINIA; MSW, 1971, UNIVERSITY OF CALIFORNIA (BERKELEY); MPH, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); EdD, 1988, HARVARD UNIVERSITY; women's health, STI/HIV/AIDS prevention in United States and developing countries
HANKEN, MARY A.; PhD, 1989, UNIVERSITY OF WASHINGTON; health information systems
KATZ, AARON; Public Health Cert, 1975, UNIVERSITY OF TORONTO (CANADA); health policy, public health, determinants of health
MASUDA, DAVID; MD, 1980, UNIVERSITY OF NORTH DAKOTA; biomedical and health informatics
MASUDA, DAVID; MS, 1996, UNIVERSITY OF WISCONSIN; biomedical and health informatics
MURPHY, GRETCHEN C.; MED, 1973, UNIVERSITY OF WASHINGTON; health information systems, health informatics, electronic health records
PILCHER, MARTHA G; PhD, 1985, GEORGIA INSTITUTE OF TECHNOLOGY; operations research/operations management, health care applications and logistics
REES, JANE; MS, 1972, UNIVERSITY OF WASHINGTON; nutritional support of adolescent health, especially during pregnancy; eating disorders
SAPPINGTON, JEREMY L.; MPH, 1964, UNIVERSITY OF NORTH CAROLINA; systems theory, human resources management, undergraduate studies in public health
STILLMAN, DENNIS; MHA, 1979, UNIVERSITY OF WASHINGTON; health care financial management, management development
THOMPSON, JOHN R.; MSW, 1976, UNIVERSITY OF WASHINGTON; public health practice, health policy analysis, work force development
WELTON, WILLIAM E.; MHA, 1972, UNIVERSITY OF MICHIGAN; DPH, 1999, UNIVERSITY OF MICHIGAN; strategic and organizational effectiveness of health systems

Pathobiology

Professor

CAMPBELL, LEE ANN; PhD, 1982, PENNSYLVANIA STATE UNIVERSITY;

molecular biology and pathogenic mechanisms of chlamydiae
CARTER, WILLIAM G; PhD, 1974, UNIVERSITY OF CALIFORNIA (DAVIS); elucidation of components in cell attachment and cell spreading in normal cells
EMERMAN, MICHAEL; PhD, 1986, UNIVERSITY OF WISCONSIN; Molecular biology of the human immunodeficiency virus
HAIGWOOD, NANCY L.; PhD, 1980, UNIVERSITY OF NORTH CAROLINA; host immunity in the control and prevention of AIDS
HAKOMORI, SEN-ITIROH; MD, 1951, TOHOKU IMPERIAL UNIVERSITY (JAPAN); DrMedSci, 1956, TOHOKU IMPERIAL UNIVERSITY (JAPAN); membrane biochemistry and glycoproteins
KENNY, GEORGE E; PhD, 1961, UNIVERSITY OF MINNESOTA; antigenic structure
KUO, CHO-CHOU; PhD, 1970, UNIVERSITY OF WASHINGTON; chlamydiae
LUKEHART, SHEILA A; PhD, 1978, UNIVERSITY OF CALIFORNIA (LOS ANGELES); immunology of infectious diseases, microbiology, sexually transmitted diseases
MCELRATH, MARGARET JULIANA; PhD, 1978, MEDICAL UNIVERSITY OF SOUTH CAROLINA; infectious diseases
OVERBAUGH, JULIE MAUREEN; PhD, 1983, UNIVERSITY OF COLORADO (BOULDER); molecular mechanisms of virus-host cell interactions/retroviral pathogenesis/aids
PARSONS, MARILYN; PhD, 1979, STANFORD UNIVERSITY; parasite cell biology
RAUSCH, ROBERT L.; PhD, 1949, UNIVERSITY OF WISCONSIN; parasitology, helminthic zoonoses
ROBERTS, MARILYN C; PhD, 1978, UNIVERSITY OF WASHINGTON; antibiotic resistance genes, plasmids, sexually transmitted diseases, oral microbiology
ROSENFELD, MICHAEL E.; PhD, 1981, UNIVERSITY OF WISCONSIN; mechanisms of atherogenesis and macrophage gene expression
SMITH, ARNOLD L; MS, 1964, UNIVERSITY OF MISSOURI; MD, 1964, UNIVERSITY OF MISSOURI; Investigating the biology of the human-restricted bacterium *Haemophilus*
STUART, KENNETH DANIEL; PhD, 1969, UNIVERSITY OF IOWA; molecular biology of parasites
VAN VOORHIS, WESLEY C; PhD, 1983, ROCKEFELLER UNIVERSITY; infectious diseases.
WHITE, THEODORE C; PhD, 1984, UNIVERSITY OF MICHIGAN; molecular mechanisms of virulence and drug resistance in pathogenic yeasts

Research Professor

LAMPE, PAUL D; PhD, 1984, UNIVERSITY OF MINNESOTA; regulation of intercellular communication via gap junctions
LINIAL, MAXINE L; PhD, 1970, TUFTS UNIVERSITY; retroviral replication and genetics, retroviral transformation
MYLER, PETER J.; PhD, 1982, UNIVERSITY OF QUEENSLAND (AUSTRALIA); regulation of gene expression in protozoan parasites
REED, STEPHEN G.; PhD, 1979, UNIVERSITY OF MONTANA; immune response to human pathogens

Associate Professor

FEAGIN, JEAN E.; PhD, 1982, STANFORD UNIVERSITY; molecular parasitology, emphasizing gene organization and expression in protozoans
KOELLE, DAVID; MD, 1985, UNIVERSITY OF WASHINGTON; allergy and infectious diseases
KURATH, GAEL; PhD, 1984, OREGON STATE UNIVERSITY; molecular biology and evolution of RNA viruses that infect fish
LINGAPPA, JAISRI; PhD, 1985, HARVARD UNIVERSITY; cell biology of virus assembly; host proteins involved in assembly of HIV and other viruses
ROSE, TIMOTHY M; PhD, 1981, UNIVERSITY OF GENEVA (SWITZERLAND); molecular biology of tumor viruses, cell growth, differentiation, and transformation
SHERMAN, DAVID R.; PhD, 1987, VANDERBILT UNIVERSITY; molecular genetics, microbiology and biochemistry of pathogenic mycobacteria

Research Associate Professor

CANGELOSI, GERARD A.; PhD, 1984, UNIVERSITY OF CALIFORNIA (DAVIS); molecular biology of tuberculosis

Assistant Professor

FRIED, MICHAL; PhD, 1991, HEBREW UNIVERSITY (ISRAEL); Malaria pathogenesis, pregnancy malaria, Parasite adhesion in the placenta, immune responses to malaria
KIRK, ELIZABETH; PhD, 1995, UNIVERSITY OF WASHINGTON; nutrition, atherosclerosis, and diabetes

Research Assistant Professor

SMITH, JOSEPH; PhD, 1994, WASHINGTON UNIVERSITY; Plasmodium falciparum, malaria

School of Social Work

Professor

CATALANO, RICHARD F.; PhD, 1982, UNIVERSITY OF WASHINGTON; crime, violence and drug abuse prevention, promotion of positive youth development
GILCHRIST, LEWAYNE D.; PhD, 1981, UNIVERSITY OF WASHINGTON; health promotion and disease prevention in community settings, women's health, research methods
HAWKINS, JOHN D.; PhD, 1975, NORTH-WESTERN UNIVERSITY; crime and delinquency, substance abuse, social development, research, prevention
HOOYMAN, NANCY; PhD, 1974, UNIVERSITY OF MICHIGAN; aging, caregivers of dependents, feminist practice, community organization development
LEVY, RONA L.; PhD, 1974, UNIVERSITY OF MICHIGAN; research methodology, single-case evaluation, health care, behavioral medicine, biofeedback
LONGRES, JOHN F.; PhD, 1970, UNIVERSITY OF MICHIGAN; race and ethnicity; children, youth, and families
MORRISON, DIANE M.; PhD, 1982, UNIVERSITY OF WASHINGTON; sexual decision-making, attitudes and behavior, teen pregnancy
PECORA, PETER; PhD, 1982, UNIVERSITY OF WASHINGTON; child welfare practice, foster care, family preservation services, personnel management
RESNICK, HERMAN; PhD, 1970, BRYN MAWR COLLEGE; organizational development, group dynamics, planned change, environmental psychology, social welfare
RICHEY, CHERYL A.; DSW, 1974, UNIVERSITY OF CALIFORNIA (BERKELEY); cultural and gender issues, intervention design and research
ROFFMAN, ROGER ALAN; DSW, 1983, UNIVERSITY OF CALIFORNIA (BERKELEY); alcoholism and drug abuse, research methodology, program evaluation
SPIEKER, SUSAN J.; PhD, 1982, CORNELL UNIVERSITY; developmental psychology, infant security, mother-infant interaction
STIER, FLORENCE E.; MS, 1941, UNIVERSITY OF PITTSBURGH; social welfare planning and program development
WEATHERLEY, RICHARD A.; PhD, 1975, MASSACHUSETTS INSTITUTE OF TECHNOLOGY; social welfare policy and administration, poverty and inequality
WHITTAKER, JAMES; PhD, 1970, UNIVERSITY OF MINNESOTA; interpersonal practice with individuals, families, and small groups; child and family policy

Research Professor

WELLS, ELIZABETH A.; PhD, 1984, UNIVERSITY OF WASHINGTON; Understanding, assessing, and intervening with issues related to psychoactive substance use.

Associate Professor

AI, AMY; PhD, 1996, UNIVERSITY OF MICHIGAN; health, mental health, aging, spirituality, coping, depression, psychosocial adjustment, PTSD
ALMGREN, GUNNAR R.; PhD, 1990, UNIVERSITY OF WASHINGTON; the relationship between race, ethnicity, socioeconomic status, and health outcomes
ANDERSON, JAMES R.; MA, 1954, INDIANA UNIVERSITY; social work and health care, interdisciplinary teams in health care, growth and development
BERLEMAN, WILLIAM C.; MSW, 1960, UNIVERSITY OF WASHINGTON; undergraduate social welfare, social welfare policy
DEAR, RONALD BRUCE; DSW, 1972, COLUMBIA UNIVERSITY; welfare and income maintenance policy and programs, fiscal impact of social programs
DUPLICA, MOYA M.; MSW, 1956, ST LOUIS UNIVERSITY; social welfare policy and history, women and social policy, values and ethics
ELLIS, JACK A N.; MSW, 1955, UNIVERSITY OF BRITISH COLUMBIA (CANADA); social welfare administration and planning, social work and the justice system
FREDRIKSEN GOLDSSEN, KAREN; PhD, 1993, UNIVERSITY OF CALIFORNIA (BERKELEY); gerontology, work and family dependent care, non-traditional families, social policy
HERRICK, JAMES E.; DSW, 1966, UNIVERSITY OF SOUTHERN CALIFORNIA; social policy, social work and the justice system, research methodology, social and cultural change
ISHISAKA, ANTHONY H.; MSW, 1968, UNIVERSITY OF CALIFORNIA (BERKELEY); DSW, 1978, UNIVERSITY OF CALIFORNIA (BERKELEY); social work practice, mental health services, services to minority communities, human development
KELLEY, JERRY LEE; MA, 1949, UNIVERSITY OF CHICAGO; social workers in schools, interviewing and counseling in human services
KEMP, SUSAN; PhD, 1994, COLUMBIA UNIVERSITY; supports to low-income families; public child welfare; social welfare history; social work theory
KRUZICH, JEAN; PhD, 1982, UNIVERSITY OF WASHINGTON; child maltreatment and substance abuse, influence of

organizational characteristics on human service

MARCENKO, MAUREEN; PhD, 1988, MCGILL UNIVERSITY (CANADA); research on the efficacy of interventions for families
MILLER, SIDNEY; MS, 1953, COLUMBIA UNIVERSITY; children, adolescents, and their families, interviewing, crisis intervention, marital counseling.
MUNDT, LENORA B.; MSW, 1950, UNIVERSITY OF WASHINGTON; family treatment
NAGDA, BIREN A.; PhD, 1996, UNIVERSITY OF MICHIGAN; multicultural and empowerment approaches in social work, organizations and education
SOHNG, SUE; PhD, 1989, UNIVERSITY OF PITTSBURGH; action research and chronic mental illness, cross-cultural social work practice
TAJIMA, EMIKO A.; PhD, 1999, BRYN MAWR COLLEGE; domestic violence; child abuse; parenting practices; law and social policy
TEATHER, EDWARD CHARLES; MSW, 1962, UNIVERSITY OF BRITISH COLUMBIA (CANADA); residential treatment of children, group work, program development
UEHARA, EDWINA; PhD, 1987, UNIVERSITY OF CHICAGO; qualitative/quantitative research methods, cross-cultural mental health, human services organization
WALTERS, KARINA; PhD, 1995, UNIVERSITY OF CALIFORNIA (LOS ANGELES); American Indian health and mental health research and multicultural counseling.

Research Associate Professor

ARTHUR, MICHAEL; PhD, 1990, UNIVERSITY OF VIRGINIA; Project Director—Community Youth Activity, Six State Prevention Needs and Assessment
HILL, KARL GORDON; PhD, 1991, BRANDEIS UNIVERSITY; Life-span human development, intergenerational mechanisms, parenting, substance use, crime
RYAN, ROSEMARY; PhD, 1987, UNIVERSITY OF WASHINGTON; behavioral HIV prevention research; AIDS services policy, planning and evaluation

Assistant Professor

ALLEN, ALLETHIA LEE; PhD, 1986, WALDEN UNIVERSITY; social work practice, social policy, interviewing, minority women, minority families, adolescents
BOYER, DEBRA; PhD, 1986, UNIVERSITY OF WASHINGTON; feminist research methodology, policy and evaluation issues, urban applied anthropology
EROSHEVA, ELENA A.; PhD, 2002, CARNEGIE MELLON UNIVERSITY;

statistical methodology in the social sciences
HALEY-LOCK, ANNA; MA, 1995, UNIVERSITY OF MICHIGAN; organizational theory & behavior, program & human resource management, nonprofit human services
LINCOLN, KAREN; PhD, 2001, UNIVERSITY OF MICHIGAN; Informal networks, the stress process, aging, SES, race, sociocultural factors and mental health
ROMICH, JENNIFER; PhD, 2002, NORTHWESTERN UNIVERSITY; Social policy, family and child well-being
WEST, MARGARET A; PhD, 1984, UNIVERSITY OF WASHINGTON; children and youth with developmental disabilities and their families

Research Assistant Professor

WALKER, DENISE D; PhD, 2001, UNIVERSITY OF NEW MEXICO; addictive behaviors, substance abuse treatment outcome, and motivational interviewing

Lecturer

AMIDEI, NANCY; MSW, 1968, UNIVERSITY OF MICHIGAN; poverty, public policy, advocacy
AVERILL, LLOYD J.; MA, 1952, UNIVERSITY OF ROCHESTER; MTh, 1966, COLGATE ROCHESTER DIVINITY SCHOOL; development and continuing education director
DE MELLO, STAN; MSW, 1982, DALHOUSIE UNIVERSITY (CANADA); MPA, 1983, DALHOUSIE UNIVERSITY (CANADA); cross-cultural social work practice
DELONG, JAMES B.; MSW, 1979, UNIVERSITY OF WASHINGTON; aging, mens and gender issues, group work, human diversity and social justice, distance learning
HAGGERTY, KEVIN P.; MSW, 1989, UNIVERSITY OF WASHINGTON; Project Director—Focus on Families, Raising Healthy Children
ROBERTS, ELIZABETH A; MSW, 1975, UNIVERSITY OF WASHINGTON; aging, social policy and aging, social work administration and field education
